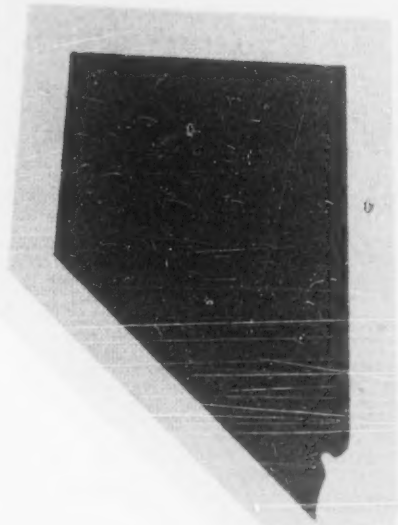
1/30/87 U7920-1



NEVADA REVIEW of BUSINESS & ECONOMICS

Fall 1986

Bureau of Business & Economic Research
College of Business Administration
University of Nevada-Reno

NEVADA REVIEW of BUSINESS & ECONOMICS

University of Nevada-Reno
Joseph N. Crowley / *President*

College of Business Administration
Henry Amato / *Dean*

Bureau of Business and Economic Research
David R. Seymour / *Director*
Thomas F. Cargill / *Editor*

Research Staff:
O. Robert Martin
Scott D. Stanton

Staff:
Carol Koletar
Kimberlee Tolkien

Nevada Review of Business and Economics
A Quarterly Publication
(ISSN 0148-5881)

Copyright 1986 by
Bureau of Business and Economic Research
University of Nevada-Reno

POSTMASTER:

Please send Form 3759 to:

Bureau of Business and Economic Research
University of Nevada-Reno
Reno, NV 89557-0016

Phone: (702) 784-6877

Second Class Postage Paid at Reno, NV

Editorial Advisory Board

Glen Atkinson / Professor of Economics, University of Nevada-Reno, NV.

William Bible / Director, State of Nevada, Department of Administration, Carson City, NV.

William R. Eadington / Professor of Economics, University of Nevada-Reno, NV.

Kyung-Il (Ed) Ghymn / Professor of Managerial Sciences, University of Nevada-Reno, NV

Andrew Grose / Executive Director, State of Nevada, Commission on Economic Development, Carson City, NV.

Thomas Harris / Associate Professor of Agricultural Economics, University of Nevada-Reno, NV.

William S. Hallagan / Associate Professor of Economics, Washington State University, Pullman, WA.

Gary Horton / Financial Economist, Nevada National Bank, Reno, NV.

Michael C. Keeley / Senior Economist, Federal Reserve Bank of San Francisco, CA.

Robert A. Meyer, Jr. / Associate Dean, School of Business Administration, University of California, Berkeley, CA.

Lee R. McPheters / Director, Bureau of Business and Economic Research, Arizona State University, Tempe, AZ.

Harold C. Nathan / Senior Financial Economist, Wells Fargo Bank, N.A., San Francisco, CA.

William J. Robinson / Director, Center for Business and Economic Research, University of Nevada-Las Vegas, NV.

Kambiz Raffiee / Assistant Professor of Economics, University of Nevada-Reno, NV.

John M. Strefeler / Associate Professor of Accounting and Information Systems, University of Nevada-Reno, NV.

Robert C. Weems / Dean Emeritus, College of Business Administration, University of Nevada-Reno, NV.

Sam E. White / Associate Dean of Undergraduate Programs and Associate Professor of Business Administration, Portland State University, Portland, OR.

Richard E. Wilson / Associate Professor of Economics, University of Nevada-Reno, NV.

Ted Mitchell / Associate Professor of Marketing, University of Nevada-Reno, NV.

Ted Cummings / Assistant Dean, College of Business & Economics, University of Nevada-Las Vegas, NV.

Gary Walton / Dean, Graduate School of Administration, University of California, Davis, CA.

James Hanna / State of Nevada, Employment Security Research, Carson City, NV.

In This Issue

Fall 1986 **Volume X, No. 3**

Innovations in the Gaming Industry:
The Case of "Megabucks" 2
John R. Mills

Recent Developments in Western Banking 8
Barbara A. Bennett and Gary C. Zimmerman

Utility Regulation: Evaluating Consumer
Protection Proposals 13
Kambiz Raffiee and Jeanne Wendel

Forecasting Nevada's Economy 21
Thomas F. Cargil and Steven A. Morus

Announcement: The Seventh International
Conference on Gambling & Risk Taking 24

Nevada Economic Indicators
Statewide Statistical Data 25
Las Vegas SMSA Data 27
Reno SMSA Data 28
Nevada Statistical Data by County 29

Selected U.S. Economic Indicators 32

General Editorial Policy

The *Nevada Review of Business and Economics* is a quarterly publication of the Bureau of Business and Economic Research, College of Business Administration, University of Nevada-Reno. Articles published in the *Review* are refereed and subject to United States copyright laws. The *Review* seeks to publish articles that focus on the business and economic environment of Nevada and the Western Region of the United States. Papers that focus on national or international topics will also be considered for publication if they either relate the topic to business and economic concerns of the Western Region or deal with a topic of sufficient interest to the Western Region. Papers can be nonquantitative or quantitative; however, in both cases, papers should focus on policy issues regarding the business and economic environment. In the case of quantitative papers, technical discussions should not be the focal point of the paper; and those cases where technical discussions are necessary, they may be more appropriately relegated to a technical appendix. The editorial policy of the *Review* is designed to reflect the interests of the readership which consists primarily of professionals in the business community, government officials and policymakers, and academics in Nevada and the Western Region of the United States. All manuscripts should be addressed to the Editor, *Nevada Review of Business and Economics,* Bureau of Business and Economic Research, University of Nevada-Reno, Reno, Nevada 89557-0016.

Innovations in the Gaming Industry: The Case of "Megabucks"

*by John R. Mills**

March 6, 1986, represents the start of a new era in the casino industry, for that is the date when International Game Technology (IGT) launched its multimillion-dollar "Megabucks" slot-machine program. The Megabucks program is the first attempt to incorporate individual casinos into a joint slot-machine network. The joint effort is an attempt to fight increased competition from other states by offering large multi-million dollar payouts. It also is an attempt to develop and attract new clientele.

The program was initiated with 125 slot machines in nine casinos around the state. Expectations are that as many as 600 machines will be on line within a year. This paper provides a brief description of the Megabucks program and discusses the changes and attributes that make the Megabucks program unique. The paper also provides an analysis of changes in accounting recognition of revenues and expenses as a result of the Megabucks program.

HOW MEGABUCKS WORKS

The Megabucks Progressive represents a multicasino agreement with International Game Technology whereby IGT provides and installs, at a mutually agreed-upon location in each casino, the IGT slot machines, carousels, seats, signage, and progressive computer. Each casino must then provide a mutually acceptable 24-hour video surveillance system for the progressive slots and agree to participate for one year. The surveillance system allows IGT to monitor the machines on a 24-hour basis, thereby being able to provide a 24-hour maintenance agreement and also provide assurance against loss from unauthorized use of the machines.

The slot machines and progressive signs in each casino are linked to a Casino Communicator (CCOM) which in turn is linked to an Accounting Data System Communicator (ADSC) and an Accounting Data System (ADS) at a secure offsite location (see Figure 1). The CCOMs and ADSCs are small microcomputers which have software programs designed to increase the progressive slot jackpot based on the number of plays of each individual slot machine. The single progressive jackpot amount is calculated by the ADS after receiving necessary data from each participating casino's slot machines. The progressive amount is then broadcast by the ADS to each casino, where it is displayed on the progressive signs. The system is in actuality a slot information system that simply monitors the progressive amount and displays the collective result. The system is capable only of transmitting the necessary data into the progressive displays; it is incapable of transmitting or downloading information that could influence the outcome of the game.

Each slot machine is an IGT Fortune II 17" Brass Video Slot Machine which uses a four-reel, 255-stop format. A base 88 percent strip with 6 percent progressive will return 94 percent back to the player. Essentially this means that for every dollar played, 88 cents will be returned to the player in smaller jackpots up to $50,000, with another 6 cents on the dollar being added to the base Megabucks jackpot. At this time the initial starting value of the progressive is $1,000,000. The 6 percent progressive amount is allocated to a primary progressive slot jackpot and a reset progressive jackpot. The primary meter will increment 4 percent while an unseen reset progressive will increment 2 percent. The reset amount is the value to which the progressive will reset when a progressive jackpot is hit and currently has a guaranteed starting value (before progression) of $100,000,000.

All administrative work associated with the progressive funds and payouts of the progressive jackpot funds is handled by IGT. The company has collectors who participate or observe the participating casino's slot drop. They verify the drop count of each participating machine and complete the Location Collection report, noting:

a. total cash pull (total drop)
b. contribution to progressive fund (percent of total handle)
c. location paid jackpots and fills
d. IGT paid jackpots and fills
e. net win
f. split

Once the casino personnel acknowledge mutual agreement of all the information on the collection report, the collector obtains IGT's share of the net win and the percent of the total handle to be added to the progressive jackpot fund and provides that information to IGT's accounting depart-

**John R. Mills is Associate Professor of Accounting at the University of Nevada-Reno, and Visiting Professor at the University of Colorado at Denver.*

ment. The accounting department then produces daily reports by location by machine as follows:

a. Performance report (actual hold/yield)
b. Meter report (all eleven video meter readings)
c. Progressive Jackpot report (daily contribution to the progressive jackpot)

Each of the participating casinos will receive a confidential report on each of their machines. Documentation of the activity from customer play to accounting by IGT is flowcharted in Figure 2.

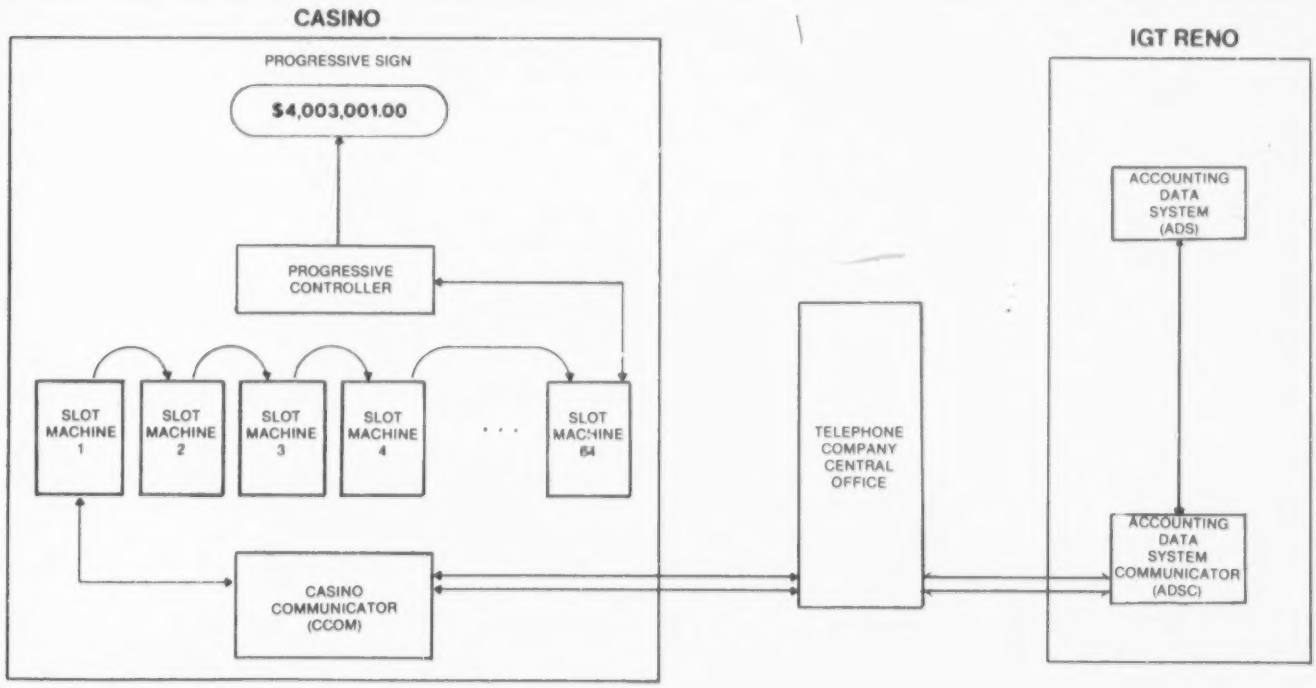
SELLING THE MEGABUCKS SLOT SYSTEM

The casino industry is a very competitive industry where each casino strives to develop and maintain its own image and clientele. Yet with the changing views on legal gaming, the Nevada casino industry needs to constantly look at new ways to generate revenue in order to maintain its competitive edge. The Megabucks Slot System represents a new package put together by IGT that offers three primary benefits to the individual casinos that participate. These benefits are defined as, (1) the ability to generate new incremental revenue; (2) the ability to limit the liabilities associated with the new revenue; and (3) the ability to maintain a more secure asset with increased physical controls.

Incremental Revenues

A survey of the changing conditions of gaming in the United States (Davis and Bermingham, August 1985) shows a substantial increase in states that are changing their view of legalized gaming. Lottery games represent the largest increase in types of gaming with five new states instituting a lottery in 1985, of which California is one. Many executives in Nevada feel that the California lottery has had a substantial negative impact on casino gaming revenue. They see groups of individuals who play the lottery games as representing persons willing to place bets on high-risk games given the opportunity to win multimillion-dollar payoffs.

Figure 1



CCOM:

1. The CCOM polls the slot machines sequentially. (1-2 seconds). The CCOM then broadcasts the latest progressive amount to all slot machines.
2. The progressive controller also recognizes the progressive amount broadcast and displays it.
3. The CCOM requests meters from all slot machines every 10 minutes.

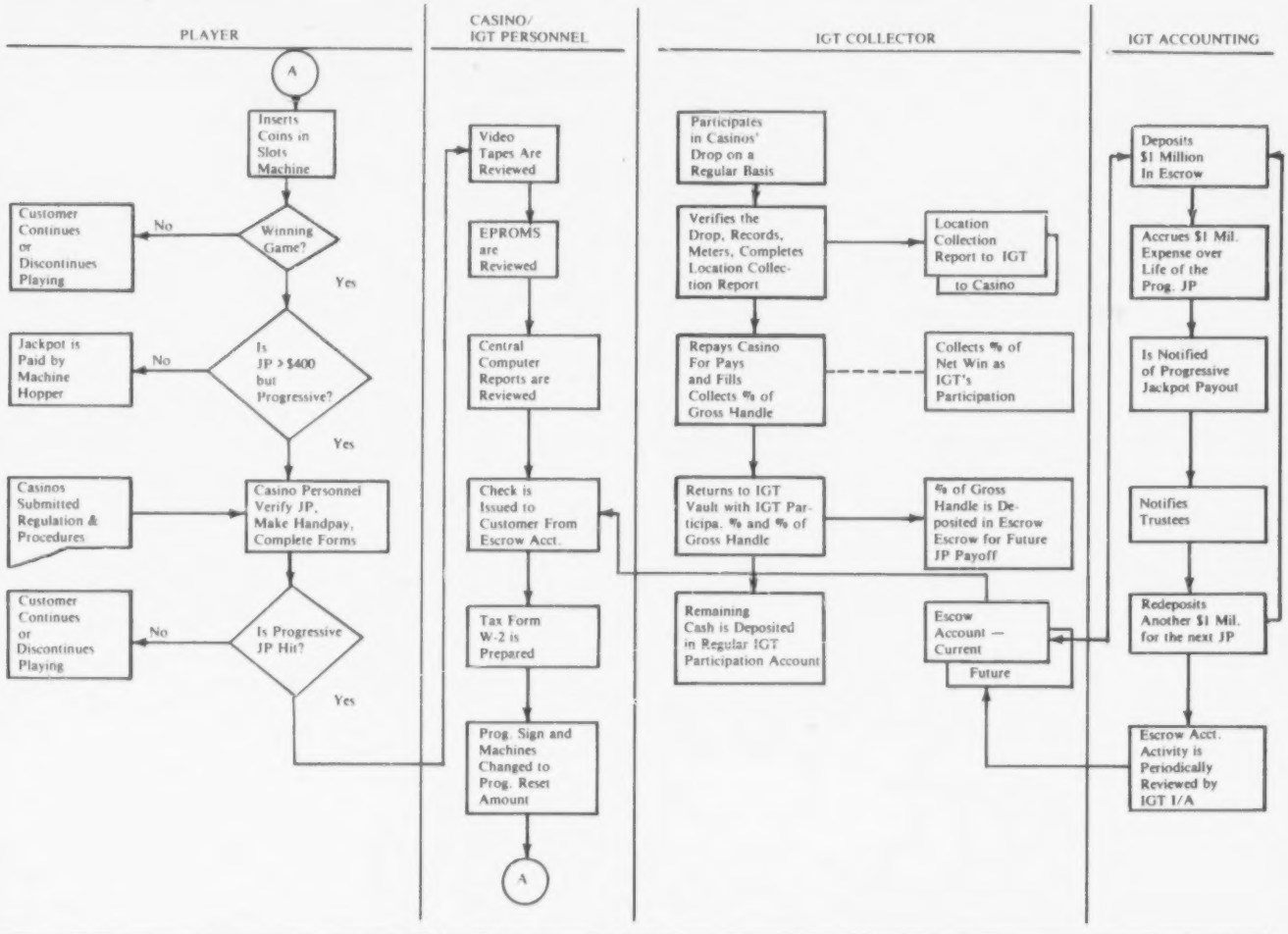
ADSC:

1. The ADSC polls all of the CCOMS on a given telephone circuit continuously (5-10 seconds).
2. The ADSC's then broadcast the current progressive amount to the CCOMS.
3. Every 5 seconds, the ADSC sends the accounting data system the total number of new coins during that period.

ADS:

1. The ADS communicates with the ADSC's and records important events on disk and on a printer—it requests meters and CCOM statuses at various times.
2. The ADS calculates the current progressive amount which is sent to ADSC's for forwarding to CCOMS and on to the slot machines (every 5 seconds).

Figure 2


PLAYER
CASINO/ IGT PERSONNEL
IGT COLLECTOR
IGT ACCOUNTING
A
Inserts Coins in Slots Machine
Winning Game?
No
Customer Continues or Discontinues Playing
Yes
Is JP > $400 but Progressive?
No
Jackpot is Paid by Machine Hopper
Yes
Casinos Submitted Regulation & Procedures
Casino Personnel Verify JP, Make Handpay, Complete Forms
Is Progressive JP Hit?
No
Customer Continues or Discontinues Playing
Yes
Video Tapes Are Reviewed
EPROMS are Reviewed
Central Computer Reports are Reviewed
Check is Issued to Customer From Escrow Acct.
Tax Form W-2 is Prepared
Prog. Sign and Machines Changed to Prog. Reset Amount
A
Participates in Casinos' Drop on a Regular Basis
Verifies the Drop, Records, Meters, Completes Location Collection Report
Location Collection Report to IGT
to Casino
Repays Casino For Pays and Fills Collects % of Gross Handle
Collects % of Net Win as IGT's Participation
Returns to IGT Vault with IGT Participa. % and % of Gross Handle
% of Gross Handle is Deposited in Escrow Escrow for Future JP Payoff
Remaining Cash is Deposited in Regular IGT Participation Account
Escow Account — Current
Future
Deposits $1 Million In Escrow
Accrues $1 Mil. Expense over Life of the Prog. JP
Is Notified of Progressive Jackpot Payout
Notifies Trustees
Redeposits Another $1 Mil. for the next JP
Escrow Acct. Activity is Periodically Reviewed by IGT I/A

They argue that the Nevada gaming industry has not catered to this type of clientele. While there are major casinos such as the Hilton and Harrah's that have progressive slots in the $100,000 to $1,000,000 range, this is still small in comparison with the multimillion-dollar California lottery payouts. Many of the smaller casinos cannot come close to offering even $100,000 jackpots. IGT argues that by setting up a joint program with all the casinos collectively participating, Nevada casinos can offer multimillion-dollar jackpots and thus effectively attract individuals interested in high-risk multimillion-dollar payouts. The Megabucks progressive slot machine system with a starting $1,000,000 jackpot that gets progressively larger as more casinos participate will provide such an incentive. IGT argues that since the Megabucks program is set up to attract a specific type of player, the program should not simply draw customers from the other slot play or other gaming areas but should in fact result in an overall incremental increase in slot revenues. While their argument is based on market segmentation theory, only monitoring of actual gaming revenues will substantiate or refute their incremental income theory.

As part of the Megabucks program, an advertising campaign has been instituted that directs clientele toward the casinos that participate in the Megabucks program. Marketing of the Megabucks program is initially being promoted from two different sources: billboards and consumer magazines. The billboards are on routes leading into Reno and Las Vegas and have a weekly update of the progressive jackpot as well as a list of participating casinos. Other billboards are also being considered in major California cities such as San Francisco and Los Angeles. The hope is that by displaying a weekly update of the progressive jackpot, individual players who might go elsewhere will be induced to go to one of the participating casinos to play.

The consumer magazines *Gambling Times* and *City Review* are currently being used to promote the Megabucks program and the casinos participating in the program. *Gambling Times* has a wider circulation than any other gaming magazine in the United States. Such a magazine is geared toward the clientele that IGT feels would play the Megabucks game. *City Review* is a Nevada magazine that is distributed to all the hotels in Nevada. Individuals who read

this magazine might be tempted to go to the participating Megabucks casinos rather than to those that do not offer the program.

Liability

The Megabucks program has basically been designed to generate additional revenue for casinos while at the same time limiting the amount of cash that a casino needs to maintain as operating cash and reducing the potential liabilities that occur as jackpots accrue.

Nevada gaming rules governing progressive slot machines require each casino to maintain the equivalent of the progressive cash payout in the casino's operating cash such that if a progressive jackpot is hit, the casino has the capability to pay off the jackpot within a 24-hour period. Because of these rules, many of the smaller casinos have not been able to put large progressive slots in because they cannot afford to tie up that much cash. The attractive feature of the Megabucks program is that the casinos can participate in the large Megabucks jackpots without having to maintain the large cash reserves. This is possible because IGT maintains ownership in each of the slot machines used for the Megabucks program and therefore it, rather than the casinos, must maintain the cash equivalents. This also means that IGT books any accrued liabilities associated with the progressive slots. In return for assuming the liability and the risk IGT essentially participates in all net winnings of the machine by splitting the net winnings on a 50/50 basis. This represents the major dilemma facing the casinos.

Casinos can buy slot machines for current market prices in the $2,000 to $3,000 range. Ownership entitles them to all the net winnings. But offsetting the winnings are additional costs incurred by the casino. Owning the slot machines also means additional costs for machine maintenance, and if the casino is running progressive slots it must maintain the additional operating cash. Casinos also incur the risk of having to pay the jackpots. The Megabucks program has IGT owning the machines, maintaining the machines, maintaining the necessary cash balance, and assuming all the risk associated with the jackpot payouts. The dilemma is whether the casinos feel that the Megabucks program will generate enough slot play to offset receiving only half of the net winnings. Obviously, having nine casinos initiate the Megabucks program and three more join in within three months after the program started seems to imply that the benefits outweigh the costs for the casinos.

Security

The recent press coverage of losses resulting from slot fraud and tampering clearly shows the need for better monitoring and physical controls of slot machines. The Megabucks program, which incorporates a 24-hour monitoring system along with new physical controls, represents a clear benefit for participating casinos. The IGT support system not only provides 24-hour video surveillance but includes a computerized sensor attached to each slot machine. This system (casino communicator) polls each slot machine on a 5-10 second polling cycle and transmits the status of each machine to the off-site location at IGT where a close watch is kept on all machine entries and exceptions. Whenever the slot machine status changes, whether because of a malfunction or a jackpot being hit, the casino communicator enters the slot-machine number, status, and time stamp into an exception report which is then forwarded to the accounting data system. Any attempt to disconnect the casino communicator from the slot machine will automatically shut down each of the slots that are connected to the CCOM. If there is a break in communications with the CCOM for 8 seconds, the slot machine locks up following the end of the game in progress, or locks up immediately if no game is in progress. The system will also automatically shut down a machine with too many exceptions.

Several modifications to the slot machines have also substantially increased security. A card cage door has been installed that includes a "card cage open" detector. The card cage is the basic operational system which is put on a computer chip panel. That panel is now installed behind a locked card cage door, and two keys are required to open it. Access to the card cage can be attained only when an IGT employee and a casino employee simultaneously unlock the cage door with their combined keys. If other than the proper personnel try to gain entry into the slot machine, a number of safeguards will alert the proper personnel. These include a slot-door-open detector, a cage-door-open detector, a sound alarm, and of course the 24-hour TV monitor and the casino communicator system. Each of these devices is checked completely before paying out any major jackpots.

Few can argue that the security is not a major benefit associated with the Megabucks program, although it would be difficult to place a price tag on the system. A summary of the major security features is included in here:

1. *Machine Audit Trail:* The machine itself will verify any win on ten different functions.
2. *Video Surveillance:* Video tape of the winning machine will be reviewed for the previous thirty (30) days.
3. *Candle Warning System:* When the card cage is opened, the machine's candle will flash at twice its normal rate.
4. *Double Card Cage Locks:* Casinos will hold keys and IGT Management will hold a key. Anytime the cage is opened, IGT Management, Casino Management and Casino Security must witness it.
5. *Card Cage Solenoids:* Each machine will have a solenoid mounted in the card cage. If the power is off for any reason, this solenoid will automatically relax and lock the cage.
6. *24-Hour Computer Monitoring:* The machines are monitored by the main computer and the casino communicator 24 hours a day. Any door opening, power off, card cage opening, is registered on a computer exception report and noted by the computer operator.
7. *Serialized EPROM and P.C. Board:* The EPROM (program chip) and processor board are serialized for additional security. These numbers are logged and compared upon any card cage opening.

8. *Serialized Evidence Tape:* Evidence tape will be used over both card cage locks and to secure the processor board to the card cage. These serial numbers are recorded and compared before opening.
9. *CMOS Memory Attached:* CMOS memory will be attached to the machine with serialized cable to prevent memory loss when a board must be replaced.
10. *EPROMs Compared and X-rayed:* When a progressive is won, the EPROMs are compared and x-rayed. These checks will be verified by members of IGT, the casino and the Gaming Control Board.
11. *Jackpot Paid by Annuity:* Progressive jackpot payment will be paid by an annuity over 10 years.
12. *Winners Publicized:* Pictures will be taken, if possible, and winners and the event will be highly publicized.
13. *Computer Independence:* The Megabucks machine is independent of the communication system in regard to any decision making function. Tampering with the phone lines cannot create a winning condition.
14. *Encryption:* The information transmitted over the direct telephone lines will be encoded.

ACCOUNTING FOR MEGABUCKS

While Megabucks is unique in that it represents the first joint effort by casinos to generate revenue, it is even more unique from an accounting perspective. Until the Megabucks program, slot machine payouts were always made as lump sums. The Megabucks program has followed the path of typical lottery payouts and spread the jackpot payout over ten years. This has changed how revenue and expenses are defined and accounted for.

Accruing Expenses and Liabilities

Generally accepted accounting principles call for the matching of expenses with the revenues generated in that accounting period. For progressive slot machines, the expense is the actual payout of the progressive jackpot. Because pay-ins (revenue) are continuous during an accounting period but payouts (expenses) occur only when the progressive jackpot occurs, accounting recognition calls for accruing as an expense any increase in the progressive jackpot amount since the last financial reporting period. Thus, if a $100,000 progressive jackpot has increased to $150,000 in this accounting period, $50,000 would be recognized as an expense in this period with a corresponding increase in the progressive liability account.

While the matching concept still applies to the Megabucks program, because the payout period has changed to ten years instead of an immediate lump-sum payout, the accountants have suggested that there is a need to take into consideration the time value of money. Thus when IGT initially set up the Megabucks program by guaranteeing $1,000,000 as a starting payout, the initial liability was not $1,000,000 but $800,000, an amount equal to what it would cost to buy an annuity that paid $100,000 for ten years.

Because the estimation of the progressive slot liability is based on the anticipated cost of a ten-year annuity, any significant change in interest rates can affect the liability amount. For example, if interest rates drop such that it now requires $820,000 for the $1,000,000 annuity, an additional increase in the estimated liability of $20,000 would have to be recognized.

The material size of the Megabucks jackpot has created another problem, that of when to recognize the expense. While the liability is booked for the amount to buy an annuity, the matching concept calls for spreading the expense over the estimated time period between jackpots. Thus, IGT spent over a year running a computerized progressive jackpot model program in an attempt to determine a realistic estimate of the number of handle pulls necessary to provide the winning combination for the progressive jackpot. Therefore, the expensing of the jackpot is being prorated over the revenue cycle based on the handle pulls. Given the estimation of the amount of play of each of the machines currently in operation, the assumption is that a jackpot will be hit approximately every four months.

Revenue Recognition

Progressive slot revenue has always been defined as the net coin drop of any machine. The Megabucks program has created two additional revenue accounts, so that IGT now recognizes: (1) net slot winnings; (2) annuity income; and (3) escrow income.

Net slot winnings represents IGT's share (3 percent) of the coin drop excluding that proportion (6 percent) being set aside for the progressive jackpot. Coin drop refers to the coins collected from each casino after making any payouts on the machine other than the progressive jackpot.

Annuity income is defined as the excess of the collections of the active and secondary progressive slot pay-ins from the present value of the progressive payouts. Again, this definition is based on the time value of money concept. Therefore, if IGT collects $400,000 from the active and secondary incremental accounts but can buy a ten-year annuity for $320,000, the excess of $80,000 is considered as annuity income. What this means is that while the agreement calls for a split of 6 percent for the win drops and 6 percent to go toward the payment of the progressive slot jackpot, in reality IGT is essentially taking a portion of the progressive slot. The amount included as annuity income will vary depending on the cost of annuity, which is basically a function of interest rates and changes thereof.

The third source of revenue is also generated from the retained progressive funds and the initial $1,000,000 set up in an escrow account. Nevada gaming laws require the establishment of an escrow account equivalent to the contingent liability associated with all progressive slot payouts. These funds are required to be maintained in a very liquid state such that they are capable of being paid out within a 24-hour period. At the present time this limitation has resulted in IGT placing the funds into an interest bearing checking account. IGT is currently considering other alternatives that will meet the Nevada Gaming Commission's requirements while providing a greater return. Any income earned on these escrow accounts are used in computing IGT's earnings. Once there is a jackpot winner, the amount

equivalent to a ten-year annuity is withdrawn from this cash account and used to buy an annuity.

Assets and Liabilities

Financial reporting of assets and liabilities is separated into those that reflect the accrual of liabilities and those that reflect actual liabilities. When the Megabucks program was initiated, a contingent liability was created because of the potential of a jackpot being hit at any time. At the start of the program and after the paying out of each jackpot, IGT creates a current interim asset account called "deferred progressive slot charge" and a current liability called "progressive liability." The asset account is the accrual of the jackpot and is reduced by the periodic allocation to the progressive slot expense account mentioned previously. The accrued liability remains in the current liability section of the balance sheet until the jackpot is hit. In addition, a separate cash asset account equivalent to the future payouts is also created. This account remains in the current section of the balance sheet until recognition of the jackpot.

Upon the recognition of the Megabucks jackpot, the current cash account and the current liability account are changed into long term assets and liabilities based on the cost of buying a ten-year annuity. IGT's intention is to set up a trust with its financial institutions, but for reporting purposes the accounts will be maintained on IGT's books. These accounts will be valued at the present value of the annuity and will be periodically reduced when payments are made to the winner.

OTHER CONSIDERATIONS

The Megabucks program offers a unique joint venture for Nevada casinos and represents a new product designed to fight the new competition created by state lotteries. It is offered as a means to attract the same type of individual that plays the lottery games and thus suggests that casinos should be able to increase total revenues because they are not cannibalizing from other casino games. Verification of these basic assumptions will be difficult. One way to do it would be to see if participating casinos' total revenue increases at a greater rate than that of non-participating casinos.

BIBLIOGRAPHY Michael P. Davis and G. B. Bermingham, "North American Gaming at a Glance," *Gaming and Wagering Business*, August 1985, pp. 10-11.

Recent Developments in Western Banking

*by Barbara A. Bennett and Gary C. Zimmerman**

In recent years, banks have been tested by a number of wrenching changes. Deposit rate deregulation has changed the way banks attract funds, making large staffs and extensive branch networks less desirable. At the same time, the sluggish and uneven pace of economic expansion as well as the sharp (and unexpected) drop in the rate of inflation have, in many cases, affected the quality of bank loan portfolios and hurt earnings performance. For some banks, losses were so great as to deplete capital. Others, however, have seen little or no deterioration in performance.

In the West, banks generally have fared well because of the relatively strong and diverse western economy, but even here, unevenness in performance has been evident. On the one hand, lower interest rates, strong retail deposit growth, buoyant consumer spending, and rapid home price appreciation have boosted lending volume and earnings at many western banks. This is especially evident in the results posted by many banks in the intermountain states of Idaho, Nevada, and Utah. On the other hand, continued weakness in certain sectors of the western economy such as agriculture, energy, mining, and commercial real estate has caused significant deterioration in asset quality. Large banks, in particular, have been hard-hit in this regard. Despite these asset quality problems, most of these large banks remain profitable, unlike a sizable minority of very small banks, which lack the portfolio and geographic diversification of the larger banks. Nonetheless, only at a relative handful of western banks have losses seriously impaired capital.

DEPOSIT GROWTH

Like banks in the rest of the country, western banks have enjoyed strong deposit growth since late 1984. Checkable deposits, in particular, have grown rapidly—in line with the surge in the Federal Reserve's M1 aggregate, which includes interest-bearing NOW and Super NOW balances as well as zero-interest demand deposits. Interest-bearing deposits have grown by over $5 billion since year-end 1984, accounting for much of the increase in checkable deposits at western banks over this time period. Small denomination time and savings deposits also have grown as a result of the $9 billion increase in money market deposit account (MMDA) balances early in this period. Moreover, in recent months, even passbook savings balances have grown, in contrast to previous years when the passbook ceiling rate prevented banks from offering an attractive yield (see Figure 1).

FIGURE 1
Selected Deposits
(Commercial Banks in the West)

This growth in deposits at western banks can be traced to a number of factors which increased the attractiveness of bank deposits relative to other investments. First, lower interest rates have reduced the opportunity cost (in terms of forgone interest on alternative investments) of holding checkable deposits, particularly since many such accounts now pay interest. Moreover, the more-or-less complete

*Barbara A. Bennett and Gary C. Zimmerman work at the Federal Reserve Bank of San Francisco

deregulation of bank deposits has enabled western banks to offer market-related yields on a wider array of products in the time and savings deposit categories. The downward trend in the rate of inflation also may have had a salutary effect on overall bank deposit growth by making financial assets in general more attractive than real assets.

The growth in deposits from consumers and small businesses, in particular, has enabled banks in the West to reduce their reliance on expensive, large denomination ($100,000 and over) certificates of deposit (CDs) and other managed liabilities such as Eurodollar borrowings (shown in Figure 1). For example, the amount of large CDs outstanding declined at 4.4 percent annual rate between December 1984 and June 1986, compared to an 8.3 percent rate of growth in 1984. This shift away from large CDs and other managed liabilities toward retail deposits undoubtedly helped to reduce western banks' cost of funds in this period. Of course, the decline in the overall level of interest rates also had a significant impact on funding costs.

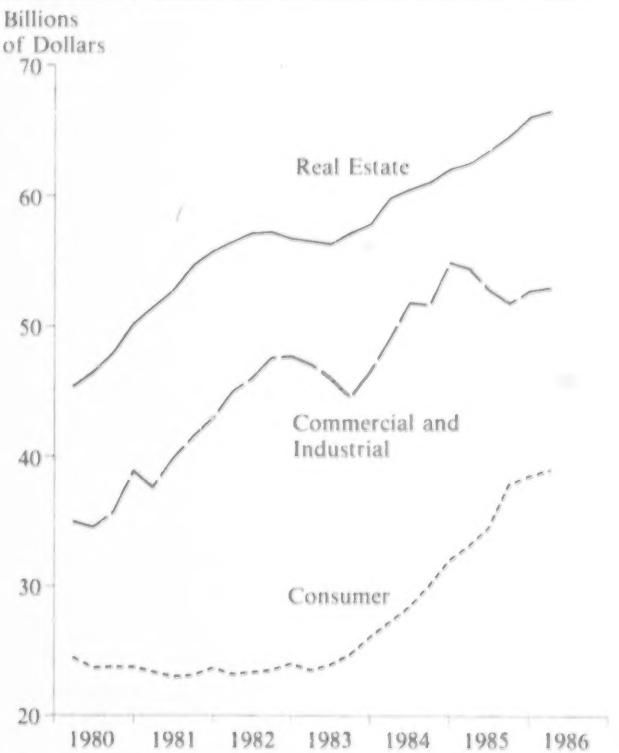
LENDING PATTERNS

Western banks' lending patterns diverged sharply during the past 18 months. For the most part, small and medium-sized banks recorded sizeable year-over-year gains in lending volume, while loans at the larger banks grew more slowly. Moreover, paced by the strong performance of banks in Utah, banks in the intermountain states tended to report stronger loan growth than banks in other western states. Several factors accounted for these disparities. First, the imposition of more stringent bank capital standards by the federal regulators tended to constrain growth at the largest banks to a much greater extent than at the smaller banks. As a group, the small and medium-sized banks in the West had capital-to-asset ratios well in excess of the new regulatory standards imposed in March, 1985. A number of the larger banks, by contrast, had to raise capital and reduce loan growth in order to increase capital-to-asset ratios sufficiently.

A second reason for the divergence in loan growth patterns was that the overall slowdown in the economy reduced the demand for business credit. Large banks are affected more by such a slowdown because they extend most of the business loans to the corporate sector. At the same time, large banks also faced stiffened competition, especially for their largest borrowers, from other sources of business credit such as the commercial paper market and the bond and equity markets. Small and medium-sized banks, as well as the larger regional banks in the intermountain states, by contrast, did not face such competition because they lend to firms that do not have access to national credit markets. As a result, business loan growth at these banks was moderately strong, offsetting some of the weakness in this area at the larger banks.

As is evident in Figure 2, sluggish business loan growth has contrasted sharply with the rapid growth in consumer and real estate lending. Overall, consumer loans grew at a 15.2 percent annual rate between December 1984 and June 1986, which was only slightly less rapid than 1984's near-record pace of 19.7 percent. For the period as a whole, strength in automobile loans and credit card receivables helped with this expansion in consumer lending, reflecting banks' aggressive marketing efforts and households' strong demand for credit. Credit card receivables, in particular, recorded a very dramatic increase, even though loan rates on credit cards did not drop significantly during this period. The rapid expansion in consumer loans has slowed considerably during the first half of 1986, however, as households have taken measures designed to restructure their balance sheets and take advantage of the current low level of interest rates. Uncertainty about the deductibility of interest on consumer loans in light of proposed tax reform legislation also may have put a damper on some types of consumer borrowing.

FIGURE 2
Loans Outstanding
(Large Commercial Banks in the West)*



* Banks with over $1.4 Billion in Domestic Assets as of December 31, 1982.

Declining mortgage rates, particularly in the first part of 1986, promoted a continuing expansion in western banks' real estate lending. Although not as rapid as the 8.2 percent growth recorded in 1984, real estate loans outstanding grew at nearly a 5 percent annual rate over the last eighteen months. Moreover, the growth in outstanding balances does not reveal the full extent of western banks' involvement in real estate lending since many banks now sell the loans they originate. Of the new loans banks keep in their portfolios, a sizable proportion has been related to commercial construc-

tion, despite growing evidence of a softening in the commercial real estate market.

In the intermountain states, banks reported stronger loan growth than did banks elsewhere in the region. Banks in Nevada, Idaho, and Utah even recorded increases in commerical and industrial loans over the last eighteen months, despite major areas of weakness in agriculture-related industries as well as in the extractive industries. Within this region, banks in Utah appear to have recorded the strongest growth in both loans and assets, while indicators for Idaho were less robust. Like banks elsewhere in the West, institutions in the intermountain states reported large increases in consumer, and to a lesser extent, real estate loans. While lending to finance agricultural production fell, reflecting the depressed state of that sector of the economy, the decline was much less dramatic than that reported by the large banks in the rest of the western region.

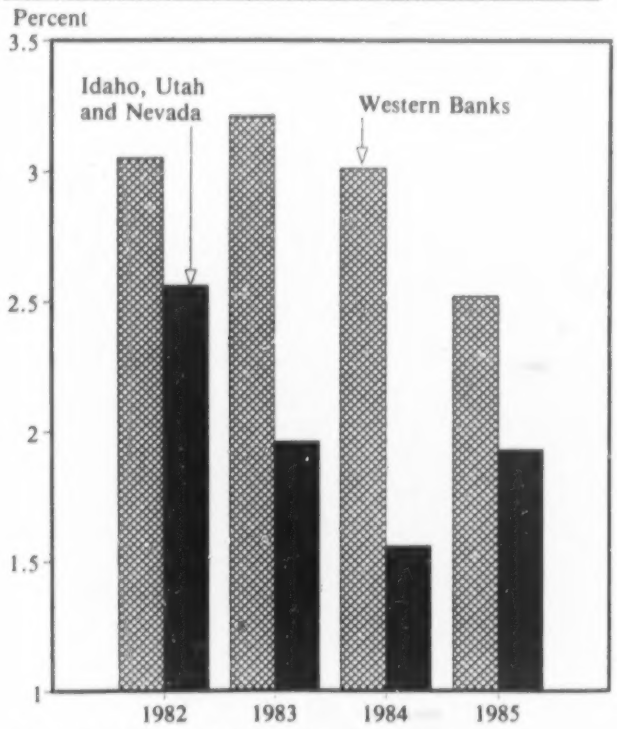
ASSET QUALITY

For banks in the West, as across the nation, the single greatest problem in the past year and a half has been the continuing deterioration in asset quality. Ordinarily, at this point in an economic recovery, banks can count on a significant improvement in asset quality as the financial conditions of their borrowers improve. However, a number of the region's key industries, including agriculture, energy, mining, and forest products, experienced continuing difficulties, leading to a rise in bankruptcies, loan foreclosures, and problem loan workouts in these areas. For the banking industry, the problems associated with the poor financial conditions of these industries were compounded by the decline in many asset prices that has continued into 1986. Loans that were made on the assumption that underlying asset prices would continue to rise at a healthy clip became problem credits in the mid-eighties as lowered inflation expectations reduced the value of the loan collateral.

The problems that banks are experiencing with agricultural loans are a case in point. Many of the farmers who borrowed against inflated land values in the 1970s, a period of rising inflation, could not service their debts when the markets for many agricultural commodities turned soft in the 1980s. Bankruptcies and loan foreclosures followed, and even though banks have been able to take possession of the collateral, losses still have been enormous because the value of that collateral has fallen in line with the decline in farm prices and profits.

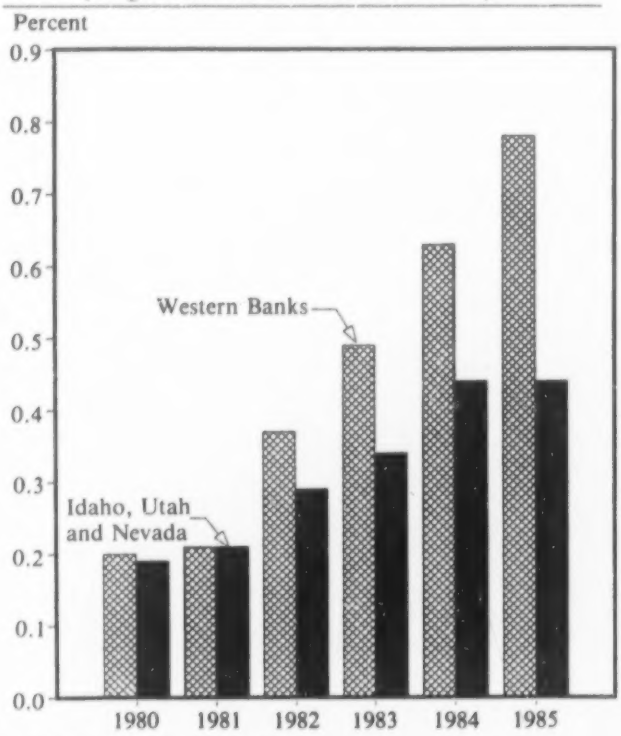
As a result of these developments over the last few years, western banks continue to experience uncomfortably high levels of so-called nonperforming loans. Although banks in the intermountain States have fared better in this regard, the ratio of nonperforming loans to total assets remains high by historical standards (see Figure 3).

FIGURE 3
Non Performing and Renegotiated Loans
As a Percentage of Total Assets
(Large Commercial Banks)*



* Banks with over $300 Million in Assets.

FIGURE 4
Net Loan Charge-Offs
As a Percentage of Assets
(Large Commercial Banks in the West)*



* Banks with over $300 Million in Assets.

TABLE 1
Loss Rates by Loan Category*
(Large Commercial Banks**)

	Total Loans		Real Estate		Business		Consumer		Agricultural	
Year	West	Intermountain	West	Intermountain	West	Intermountain	West	Intermountain	West	Intermountain
1980	0.34	0.34	0.01	—0.01	0.31	0.47	1.13	0.68	N.A.	N.A.
1981	0.34	0.38	0.02	0.04	0.48	0.69	0.99	0.60	N.A.	N.A.
1982	0.59	0.52	0.08	0.11	1.00	1.11	1.18	0.66	N.A.	N.A.
1983	0.77	0.62	0.17	0.18	1.32	1.21	0.97	0.57	N.A.	N.A.
1984	0.92	0.74	0.34	0.55	1.44	1.34	0.90	0.42	4.30	0.62
1985	1.13	0.67	0.33	0.39	1.78	1.16	1.35	0.49	4.12	1.84

* *Loss rate is defined at loan charge-offs less recoveries as a percent of loans outstanding.*
** *Banks with $300 million or more in total assets.*

In line with the high level of nonperforming loans, recorded loan losses have risen sharply (see Figure 4). By loan category (excluding foreign loans), the loss rate was highest for banks' agricultural loans. Business loan losses also have risen dramatically over the course of the present business cycle, as have losses on real estate loans. Consumer loan chargeoffs increased for the West as a whole, but declined slightly at the intermountain banks (see Table One). Moreover, large banks experienced higher loss rates than did small banks, largely because of their generally more aggressive lending activities in previous years. Continuing problems in large banks' international loan portfolios also contributed to these banks' relatively poor loss experience in recent years. As a result, a number of banks in the West, including some of the largest, posted very poor results in 1985 and the first half of 1986.

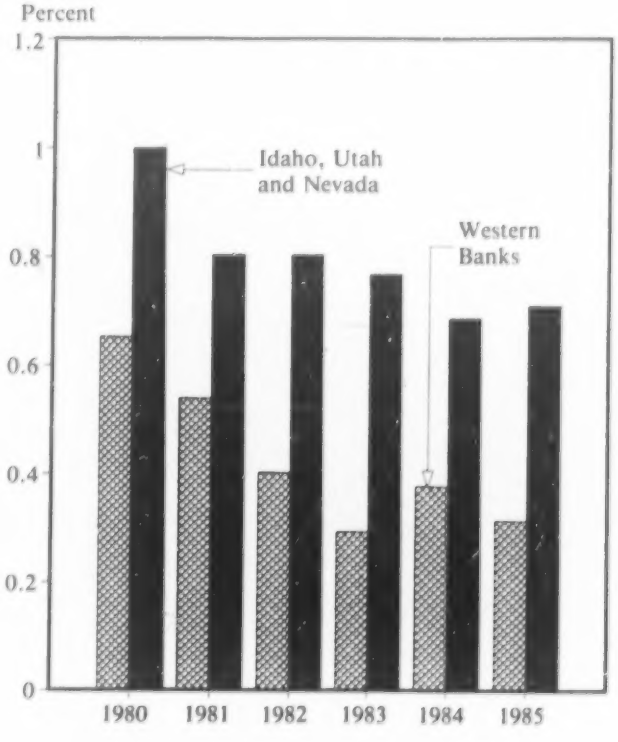
WEAK EARNINGS

The aggregate earnings of western banks over the last few years have been hurt by poor earnings and even losses at some of the largest banks. The single most important factor influencing earnings has been the deterioration in asset quality and the consequent increase in the provision for loan losses. In the aggregate, expenses for loss provisions increased by a third, climbing to more than $4 billion for 1985. Such large expenses hurt earnings but enabled banks to replenish capital reserves following loan write-offs. Although data are not yet complete for the first half of 1986, preliminary evidence suggests that banks continued to increase their reserves as a buffer against future write-offs on the still-large volume of nonperforming loans.

Western bank earnings also suffered from the relatively sluggish growth in business loans in 1985 and 1986. Slower loan growth has meant reduced earnings from interest income and loan fees. At the large banks, asset growth and thus income growth were curtailed in part to meet the regulators' new capital adequacy standards.

Despite these problems, many banks in the West posted strong earnings gains of 10 to 15 percent for 1985, with similar results estimated for the first half of 1986. In the intermountain states, banks reported a 16 percent increase in net income, well above the average for the western region for 1985 (see Figure 5). Overall, western banks have enjoyed a modest improvement in net interest margins, or the spread between the return on assets and the cost of funds. The growth in consumer deposits, as well as the decline in the level of interest rates since mid-1984, has led to a larger decline in banks' interest expense than in the yield on their assets.

Figure 5
Return on Assets
(All Commercial Banks in the West)



* Net Income as a Percentage of Total Assets.

Banks' earnings from fee-based income also have improved, as they have moved toward more explicit pricing of products. Relatively new fee-based products, such as discount brokerage services and credit-related insurance, along with the rising importance of fees from mortgage banking activities have helped with the earnings picture. More explicit pricing of checking account and other deposit services, as well as the growing popularity of commercial loan fees have also added to bank revenues.

On balance, western banks are making the most of a difficult period. While earnings have been anemic compared to what one would expect for this point in the economic recovery, most banks have dealt remarkably well with the industry-wide problem of deteriorating asset quality. Moreover, large loan write-offs taken during 1985 and early 1986, as well as growth in equity capital and reserves, now place many institutions in a stronger position to deal with problems through the end of 1986.

LOOKING AHEAD

The economic developments of the last year and a half have presented the western banking industry with some mixed blessings. On the bright side, lower interest rates and continued, albeit sluggish, economic growth fueled rapid growth in banks' consumer and real estate lending activities. Lower interest rates also produced a rapid expansion in western banks' checkable and smaller denomination time and savings deposits to help fund these loans. Reduced reliance on purchased funds, as well as a decline in the overall cost of funds, boosted banks' net interest margins. For many banks, particularly those in the intermountian states, these developments yielded significant earnings gains.

At the same time, however, most western banks also had to struggle with a serious deterioration in asset quality brought on by continued weakness in certain key sectors of the western economy and, ironically, the precipitous drop in the rate of inflation. Some banks fared better than others. Nonetheless, losses on nearly every loan category rose during this period.

Unfortunately, the asset quality problems encountered in the past 18 months are not likely to go away quickly or easily. The near-term outlook for the weaker sectors of the western economy is not promising, implying that the banking industry cannot look forward to any real improvement in its asset quality problems through changes in the financial conditions of its borrowers. Rather, it must continue to resolve these problems through loan write-offs and additions to loan loss reserves. To a large extent, the industry already has undertaken the necessary steps to restore the health of its balance sheet.

Assuming no further deterioration in asset quality, earnings performance for the industry as a whole should begin to improve in coming months. However, that improvement is likely to be modest—a development which does not bode well for capital accumulation. Diminished internal capital accumulation is particularly troublesome in light of federal bank regulators' push for more stringent capital-to-asset ratios, including, possibly, some form of adjusted capital measure that would require banks to hold capital based on the risk composition of their portfolios.

In sum, western banks have been through some trying times in the past 18 months. They have dealt remarkably well with the industry-wide problem of deteriorating asset quality. However, because the needed loan write-offs and additions to loan loss reserves have slowed the rate of capital accumulation, western banks face some trying times ahead as well.

Utility Regulation: Evaluating Consumer Protection Proposals

*by Kambiz Raffiee and Jeanne Wendel**

1. INTRODUCTION

Many utility commissions around the nation face rate increase requests to reimburse investors for newly constructed plants that are not needed to satisfy current demand. With construction work currently in progress equal to 36% of the net value of existing plants, these problems are expected to continue for several years.

After the dramatic oil price increases in the 1970s, electricity demand growth rates dropped substantially. Utilities gradually revised their growth forecasts downward, but they could not be certain at first whether the decrease was permanent or temporary. Increased construction costs and lead times as long as eight to ten years exacerbated the difficult problem of balancing the goals of ensuring adequate capacity and avoiding unnecessary costs.

Increased uncertainty about potential oil price increases and reliability of oil supplies also contributed to the problem. Some utilities constructed new coal or nuclear plants even where capacity was adequate in order to reduce their reliance on fuel oil and reduce the risk from skyrocketing oil prices.

The question of who should pay for the excess capacity investments is complex. Rate commissions must consider issues of overall fairness, long-term impacts on efficiency, and the immediate difficulties associated with adjusting to policy changes. This paper examines three approaches used to deal with these issues: Phasing-in plans, the Used and Useful criterion, and the Prudent Investor criterion. We begin with a brief review of recent trends to provide a background for understanding the problem presented in section 2. Section 3 then provides an overview of the traditional rate-setting process and the three proposals to modify the process in response to the excess capacity problem. Sections 4 through 6 discuss each proposal in detail. The conclusion then describes steps taken by some commissions to strengthen the role of market forces in the retail market for power.

2. RECENT TRENDS

The utility industry has undergone substantial changes since 1970. Before that date, prices fell as utilities realized scale economies from new technology and electricity use increased steadily at approximately 7 percent per year. As shown in Appendix Table 2, the U.S. nominal average price fell 0.45 percent per year from 1951 through 1972 while the nominal average price in Nevada fell more slowly at 0.22 percent per year. Three events in the early 1970s produced drastic changes from the historic pattern. Exhaustion of scale economies, new pollution control requirements, and the rapid increases in oil prices pushed costs up rapidly. From 1976 through 1980, nominal average prices increased 10.65 percent per year throughout the U.S. and 11.9 percent in Nevada. In response to this dramatic shift in the price trend, electricity use decreased for the first time since World War II.

TABLE 1
Ten-Year Forecast
Average Annual Growth Rate for Summer Peak Demand

Year	Annual Growth Rate Forecast for Next 10 Years
1974	7.6%
1975	6.9%
1976	6.4%
1977	5.7%
1978	5.2%
1979	4.7%
1980	4.0%
1981	3.4%
1982	3.0%
1983	2.8%
1984	2.5%

Source: Electric Power Supply and Demand for 1985-1994," *North American Electric Reliability Council*, 1985.

The industry's response to this drastic change was cautious disbelief. After two years in which peak demand grew 1.5 percent and 2.3 percent, the 10-year forecast was revised downward from 7.6 percent in 1974 to 6.9 percent in 1975, as shown in Table 1. Utility companies that are required to supply all the power demanded at the regulated rate were reluctant to scale down construction plans in

**Kambiz Raffiee and Jeanne Wendel are Assistant and Associate Professors of Economics at the University of Nevada-Reno, respectively.*

response to a demand shift that might prove to be temporary. Growth projections were reduced slowly throughout the decade but remained higher than actual growth rates. Thus, from 1973 through 1982, growth averaged 2.1 percent per year and capacity increased 3.4 percent per year. Construction projects based on these overestimates of demand growth are expected to lead to increased levels of excess capacity for several years.

One approach to measuring capacity utilization is to compare actual electricity generated in one year with the potential capacity for generation. As shown in Table 2 (in Appendix 1), the rate of capacity utilization declined slowly in both Nevada (-0.15 percent per year) and the U.S. (-0.14 percent per year) from 1951 through 1972. This decline increased dramatically after the energy crisis to -0.47 percent per year in the U.S. and -2.02 percent per year in Nevada.

Another approach to evaluating capacity requirements is the concept of the reserve margin, which measures the proportion of capacity held in reserve when peak loads are served. This statistic measures the ability of a utility to respond to generator failure by substituting reserve equipment. One rule of thumb indicates that a 20 percent reserve margin is adequate to meet a quality standard of no more than one generator-based power outage in ten years; current estimates of the aggregate reserve margin are substantially higher than 20 percent. The National Electric Reliability Council expects excess capacity to continue in most areas through 1992.

The appropriate level of reserve capacity depends on many factors. Increased interconnection between utilities decreases the need for reserve capacity since power requirements due to generator failures or unexpected levels of demand can be met by purchasing power from other regions. Contracts with interruptible customers also increase a utility's flexibility and reduce the need for reserve capacity. On the other hand, construction of a very large plant to generate a significant portion of a utility's power supply increases the reserve margin required to ensure continued service during a failure of the large plant. Reserve margins would also be high for several years if projected growth can be supplied most efficiently by building a single large plant to handle (say) ten years of growth rather than constructing a smaller plant to handle demand for five years and a second plant in five years.

Finally, some apparent excess capacity reflects efforts by the utility industry to adapt to the changes in fuel price. Some utilities built coal or nuclear plants to reduce dependence on fuel oil plants. If the fuel oil plants were retained as back-up capacity, the new plants would appear to represent excess capacity. In fact this strategy may reduce overall costs by reducing exposure to the risks associated with further oil price increases or supply disruptions.

Despite these considerations, many commissions are concerned about the appropriate response to excess capacity situations. The Electric Reliability Council expects most regions to continue to have overcapacity until 1992.

3. RATE-SETTING UNDER TRADITIONAL REGULATION

Overview of the Regulatory Process

Traditional rate of return regulation focuses on providing investors with a fair return on invested capital. The process includes four steps. First the commission determines the "fair" rate of return for investors by evaluating the firm's cost of capital. The overall rate of return the utility will be permitted to earn is a weighted average of the firm's cost of borrowed capital and the allowed (or "fair") return on equity. For the Sierra Pacific Power Company, for example, the allowed return on equity is 14.3 percent and the overall allowed rate of return is 11.4 percent.

The second step is to establish the amount of invested capital eligible to earn the fair return, which is known as the rate base. When a new plant with equipment is completed and ready for use, the construction cost is typically added to the previous rate base so that investors can begin earning a return on the new investment. The rate base is adjusted in subsequent years for depreciation so that the plant cost is gradually eliminated from the rate base.

The third step is simple arithmetic. Multiplying the allowed rate of return by the rate base gives the revenue that must be collected from customers to provide the investors' allowed return. Total revenue will be set to also cover operating cost, taxes, and depreciation in addition to this return on the rate base. In this way, investors' capital is returned through annual depreciation and the return is earned on the outstanding capital in the rate base.

Finally, prices per kilowatt are set to provide the required revenue. The greater the sales forecast (in number of kilowatts), the lower the resulting prices. If demand is expected to be low, however, the price per kilowatt will be higher.

Consumer Protection Proposals to Modify the Process

The widespread construction of excess capacity has raised several concerns about this process. Three proposals to modify the traditional approach to regulation are described in the subsequent sections. In addition to these proposals to adjust the traditional approach, some industry observers have been discussing the more radical possibility of competitive market-based pricing for generated power instead of regulatory cost-plus pricing. Some initial steps that have been taken to increase the role of market forces within the regulatory framework are described in the concluding section.

The first concern is rate shock. When an expensive plant is completed and added to the rate base, utility rates can increase sharply. Rate shock could be reduced by phasing the new plant into the rate base gradually instead of adding the entire cost to the rate base when construction is complete.

The second concern focuses on the allocation of risk between consumers and investors. Regulators have traditionally minimized the risk to investors in order to minimize the rate of return that would be required to attract capital investment. Under this policy, consumers pay the allowed return on new investments, even if consumer demand is in-

sufficent to justify the additional capacity. Some consumer advocates have proposed transferring this risk from consumers to investors by including in the rate base only new capacity that is Used and Useful.

Third, permitting investors to earn the allowed return on all investment does not provide incentives for sound management. These incentives could be strengthened by evaluating whether the decision to build was based on sound forecasting techniques and reimbursing investors only if the decision to build was prudent. This Prudent Investor criterion for inclusion in the rate base differs from the Used and Useful criterion in its treatment of unforeseen events. Under the Used and Useful rule, investors would not be reimbursed for excess capacity under any circumstances. In contrast, the Prudent Investor criterion would authorize payment for excess capacity if investors had reason to believe the plant would be needed when the investment decision was made.

4. PHASING-IN PLANS

Phasing-in Plans Are Equivalent to Loans from Investors to Consumers

With some jurisdictions facing the possibility of doubling utility rates, consumer advocates are concerned about rate shock; many consumers would have difficulty adjusting to such a drastic change in electricity rates. Phasing the new plants into the rate base instead of including them all at once would provide a more gradual increase in rates and allow consumers time to adjust to the new rate level. If the Phase-in plan starts when construction is complete and therefore delays payment for the new plant, it also increases the interest consumers must pay to investors. Whether the plan actually benefits an individual consumer, therefore, depends on his assessment of the trade-off between adjustment time and interest costs.

Phase-in plans typically provide investors with the same present value of payments as the traditional policy; some of the allowed return is simply delayed a few years. One plan considered by the State Consumer Advocate's Office would have phased the cost of Valmy II into the rate base over a three-year period. The plan would have added 40 percent of the cost to the rate base the first year, while the remaining 60 percent of the new plant cost would have been charged to an account, Allowance for Funds Used During Construction (AFUDC). Money in this account accrues interest, which is capitalized so that the AFUDC account would enter the second year with funds equal to 60 percent of the construction cost plus interest for one year. Half of the AFUDC account would have been added to the rate base in the second year while the other half would have continued to accrue interest until it was added to the rate base the following year. The total amount added to the rate base by the end of year three would equal the new plant cost plus the AFUDC interest. Provided the AFUDC interest rate is equal to the investors' allowed rate of return, the present value of payments to investors is not affected by the Phase-in plan.

Since the Phase-in plan delays payments without changing their present value, the plan is equivalent to a loan from investors to consumers for the amount of the delayed payment. The appropriate interest rate on this loan would be the utility's overall rate of return, which is currently 11.4 percent for the Sierra Pacific Power Company.

Impact of a Phase-in Plan on Consumers

The impact on consumers of a Phase-in plan that essentially represents a "loan" to consumers from the power company investors at 11.4 percent interest depends on each consumer's individual situation. Since the "loan" would not be viewed as a loan for tax purposes, there are no deductible interest payments. The 11.4 percent rate therefore represents the after-tax rate. This contrasts with the cost of an 11.4 percent mortgage for which the effective after-tax rate is often substantially below 11.4 percent. The plan therefore provides more benefits to consumers in low tax brackets than to households with high marginal tax rates.

Second, the impact of the Phase-in plan depends on the individual consumer's financial situation. For consumers who use the proceeds of the "loan" to pay off credit card debts, such a loan represents sound financial management. For other consumers, however, who would prefer not to borrow money at 11.4 percent after taxes, rapid payment for the power plant makes more sense.

Finally, the impact of the Phase-in plan depends on the consumer's time horizon. The trade-off between lower initial rates and higher future rates helps current consumers at the expense of future consumers.

Evaluation of the overall impact of the Phase-in plan on consumers would require identifying categories of consumers that are helped and hurt by the plan. To the extent that low-income consumers incur low marginal tax rates and have high discount rates, the plan favors this group. For low-income consumers who are net savers rather than borrowers, however, alternative rates of return may be less than 11.4 percent. In this case, the plan may have adverse consequences for some low-income groups.

These trade-offs would be reversed for a Phase-in plan that advances payment for the new plant by starting to phase it into the rate base before construction is complete. In this case, the consumer would begin making payments earlier than under the traditional approach and total interest costs would be reduced. This plan would benefit the groups harmed by the delayed Phase-in plan, and vice-versa.

5. USED AND USEFUL CRITERION

The Used and Useful Criterion Transfers Risk From Consumers to Investors

The Used and Useful criterion has been applied by some commissions concerned about the optimal distribution of risk between consumers and investors. The controversy over who should bear the risk associated with uncertain demand involves two issues.

First, as investors bear more risk, the rate of return required to attract capital must increase. Consumers have traditionally chosen to bear the risks associated with uncer-

tain demand and uncertain construction cost rather than pay investors to perform this function. However, the substantial increase in the level of risk inherent in the utility industry has sparked a reconsideration of this issue. Now that demand projections are more uncertain and construction costs are both higher and more uncertain than previously, some consumers face sudden and sharp rate increases. Investors may be in a better position to diversify their portfolios to minimize the impact of this risk.

Second, some observers advocate transferring the risk to investors because investors exert control over risk management decisions. Examples of decisions that affect a utility's risk exposure are wide-ranging. Construction of one large plant instead of two smaller facilities may minimize operating cost but increase exposure to the risk of slack demand. Investing in interconnecting transmission lines may decrease risk; long-term contracts to purchase power assure supply but increase the risk from slack demand. Construction of new plants to utilize coal reduces the risk from fuel oil price increases but may yield excess capacity.

Some commissions have reduced the risk born by consumers by adopting the Used and Useful criterion for evaluating new capacity. Under this rule, new capacity is added to the rate base only if it is expected to be used and useful; investors therefore receive no return on excess capacity. While the results of this policy depart radically from the fair return on fair value concept in some respects, the application of the Used and Useful test can also be viewed as a simple modification of conventional procedures. Traditionally, expenditures on construction work in progress could not be included in the rate base until the plant was complete and ready for use in the engineering sense. The Used and Useful rule adds an additional criterion: the plant must be ready for use in the economic sense that it is needed to efficiently meet consumer demand.

Long-Term Impact of a Used and Useful Criterion on Consumers

Much of the discussion of the merits of this approach has focused on a very narrow concept of consumers' interests that equates these interests with low prices in the short run. In this paradigm, consumers and investors play a zero sum game in which one group can benefit only at the expense of the other. This view of consumers' interests tends to focus attention on the controversial question: who *should* pay for the excess capacity plant. If investors exert control over decisions, perhaps they should bear the risk of excess capacity. On the other hand, concern for fairness to investors who purchased stock under the previous regulatory policy indicates that consumers should pay for these plants.

A more comprehensive view of consumers' interests indicates, however, that discussion of who *should* pay misses the mark. Consumers who plan to continue purchasing power for several decades are interested in minimizing both current and future prices. Current pricing policies may affect the utility's incentive to invest in new capacity to replace inefficient units, employ improved technology or install new equipment to adjust to changes in relative fuel prices. By definition, cost effective investments will reduce expected future operating costs enough to reduce future electricity prices. Since low prices today may discourage such investments and lead to higher prices in the future, more careful consideration of consumers' interests is required to evaluate the Used and Useful policy.

Indeed we have an interesting strategic situation in which each party controls one important variable: consumers (through the regulatory commission) control current price and the utility investors control the level of current investment which will determine future costs of production, thereby affecting future prices. Since the utility will consider the commissions' price policy when it evaluates potential new investments, the commission's current price policy will affect investment, future costs, and future prices. The simple rule of thumb that consumers always prefer low prices may be misleading since low current prices might result in high prices in the future due to inadequate investment. Meaningful evaluation of any pricing policy must include consideration of the impact on utility investment and the resulting indirect impacts on future costs and prices.

Long-term consumer protection therefore requires consideration of the impact of commission policy on the utility's investment decision. A profit-maximizing utility will undertake investment projects when the expected benefits outweigh the cost. Under traditional rate regulation, the expected benefits were fairly predictable; if the firm could control cost overruns, it could reasonably expect to earn the allowed rate of return on new investment. Under the Used and Useful policy, in contrast, the return is much more uncertain. If future demand turns out to be low, the commission may rule that a new plant is not Used and Useful, and disallow any return on the project. Alternately, if future oil prices are relatively low, a new coal-fired plant may not seem Used and Useful even though the previous decision to convert to coal may have been sound at the time. Unlike unregulated firms, the utility's risk of loss due to low demand or changes in fuel price relationships is not balanced by the possibility of windfall profits if demand or oil prices turn out to be higher than expected. Thus, the Used and Useful policy transfers to investors only the downside of the risk without permitting the compensating possibility of gain. Adopting the Used and Useful policy will therefore lead to reduced utility investment unless the allowed rate of return is increased to compensate for the increased uncertainty.

Adopting a Used and Useful criterion may therefore reduce utility investment, depending on whether the allowed rate of return is increased enough to completely compensate the investor for the increased risk. To evaluate this impact, it is useful to consider the concept of efficient investment, where the efficient level of investment minimizes expected capital and operating costs. We constructed a simple mathematical model to compare the efficient level of investment with the level likely to occur under the Used and Useful rule. This model uses conventional assumptions about the relation between investment and future operating cost a detailed description is available in Raffiee and Wendel (1986). Evaluating the model indicates that total revenue

paid by consumers is minimized by setting the allowed rate of return above the current level but below the level required for efficient investment.

The Used and Useful Criterion and Under-Investment

Thus application of the Used and Useful rule will lead to problems with under-investment unless the rule is accompanied by additional rules requiring the firm to undertake sufficient investment to minimize cost. Monitoring compliance with such requirements would be extremely difficult because of the complexity of the trade-offs between fuel mix, scale economies, flexibility to adapt to unforseen events, optimal retirement of older facilities, and the value of new technology. One of the basic tenets of a free market economy is that the individual firm will generally have more specific information about its situation and therefore make better decisions than any other agency. The traditional view of the role of regulation has acknowledged the importance of this type of information. Regulation has sought to provide appropriate incentives and constraints to induce regulated firms to provide good service at reasonable cost rather than dictating detailed procedures for providing that service.

Reducing consumers' exposure to demand uncertainty by transferring the risk to investors may yield net benefits if consumers are generally more risk averse than investors. The Used and Useful rule may accomplish this goal only with the unfortunate side-effect of higher production costs due to inadequate capital investment.

6. PRUDENT INVESTOR CRITERION

The Prudent Investor Criterion Addressees the Potential for Overinvestment

A third proposal deals with the possibility that some of the current excess capacity may have resulted from poor management or purposeful overinvestment. In this case, the concept of fair return should probably apply only to capital that is invested wisely. The legal concept of prudence traditionally establishes a standard of care for evaluating performance. Some commissions have adopted this concept and required consumers to pay for all investments that would have been undertaken by prudent utility management. No hindsight is permitted in the traditional use of this concept; the fact that the completed plant is unnecessary would not provide evidence of imprudence. The Prudent Investor test is not new but it has not been used widely until recently. A recent study (Burns, et al) counted seven significant uses of this test from 1944 through 1974 for capacity and rate base issues and forty decisions based on the test from 1974 through 1983. These cases involved plant cancellations, failure to cancel excess capacity plants, rate base issues, and the prudence of load forecasting procedures. Use of this principle has been upheld by the Florida State Supreme Court, involving a decision by the Florida Public Service Commission to exclude an investment from the rate base because of faulty load forecasting. In addition, the Kansas state legislature recently passed a law specifically authorizing the commission to exclude capacity from rate base if the decision to build was imprudent. The statute details several tests to evaluate imprudence including comparison of the proposed rate with the existing rate and evaluation of the impact of the proposed rate increase on the state's economy. This application of the prudence concept differs from the traditional use in that the commission is permitted to use current information to evaluate the prudence of the utility's previous decision.

The Prudent Investor rule is often used along with the Used and Useful rule. Indeed, prudence investigations are generally undertaken only if the new capacity is not Used and Useful. Standards such as those included in the Kansas statute blur the distinction between excluding a new plant from the rate base because it is unnecessary and excluding it because the initial decision to construct the plant was imprudent. The additional possibility of finding management to have been imprudent for failing to cancel a plant during construction also blurs the line between these two criteria.

Overinvestment may occur for two reasons. As mentioned above, the utility may simply be poorly managed. However, the potential for overinvestment may be more substantial due to the incentive structure created by the traditional regulatory process. This problem was described in an article written by Averch and Johnson (1962) and is widely referred to as the A-J effect. Even a well-managed firm can increase its profit by increasing investment beyond the efficient level because rate of return regulation permits the firm to earn a profit on invested capital but not on the use of other inputs. A firm is always biased toward building a new plant rather than using other options to meet demand.

Under the Prudent Investment rule, the regulator evaluates the firm's investment decision to determine whether a prudent investor would have made the same choice. If the regulator finds that the firm's investment was prudent, the entire investment is added to the rate base and earns the allowed return. On the other hand, if a prudent investor would have invested an amount less than the actual investment, then that smaller amount is added to the rate base. The application of the policy is less clear when the prudent investor would have invested an amount greater than the firm's actual investment. Even though the prudence evaluation normally takes place when construction is complete, it is usually based on information that would have been available when the firm made its decision in the first period; no Monday morning quarterbacking should be permitted. The hypothetical prudent investor is assumed to minimize the expected present value of the cost of satisfying consumer demand.

The Prudent Investor Criterion, Uncertainty, and Under-Investment

Since the prudence evaluation typically occurs when construction is complete, the firm is uncertain about the outcome of this proceeding when it initiates investment projects. This uncertainty about the outcome of the prudence evaluation can be attributed to the firm's uncertainty about the regulator's ability to ascertain the cost-minimizing level

of investment. Second, the firm may be concerned about the impact of political pressures on the commissions prudence evaluation. The evaluation criteria included in the Kansas statute would clearly increase the firm's uncertainty about the evaluation process. Third, the firm may believe that the regulator is a competent agency with efficiency as a goal. At the same time the firm may realize that both economics and production engineering are arts rather than sciences. The firm would then be uncertain about the numerous judgment calls that must be made to evaluate prudence. If the firm's estimated cost of capital under the traditional approach is 15 percent and the typical construction period is eight years, an allowed rate of 25 percent would be required to induce the firm to invest efficiently.

Since the firm is uncertain about the outcome of the prudence evaluation when it evaluates potential new investment projects, this policy reduces the expected profitability for each project. Fewer projects will be undertaken unless the allowed rate of return is increased to compensate the utility for the increased risk.

The magnitude of the increase in the allowed rate of return required to induce efficient investment can be estimated for one special case in which a firm's estimated probability distribution for the approved level of investment is symmetric with the mean equal to the efficient level of investment. Since the Prudent Investor policy is aimed at overinvestment, this side-effect could be beneficial if the level of investment is simply reduced to an efficient level.

Evaluation of the model mentioned in Section 5, however, indicates that investment may be reduced below this level. As with the Used and Useful policy, minimizing total revenue paid by consumers to the utility requires setting the allowed rate of return above the current level but below the level that would induce the firm to invest efficiently. Thus, application of the Prudent Investment policy is likely to substitute underinvestment for overinvestment; it is not clear that consumers will benefit.

Modifying the Prudent Investor Criterion

The Prudent Investor policy reduces the firm's expected revenue and increases the firm's risk by adding an unnecessary element of uncertainty: the regulator's second-period prudence evaluation. These adverse impacts on the utility must be offset by an increased allowed rate of return to obtain any given level of investment. The problem could be avoided by conducting the prudence evaluation before construction begins.

In this case, the firm would already know the outcome of the prudence evaluation before it finalizes its investment decision. Assuming the regulator sets the prudent level of investment equal to the efficient investment level, the utility will invest efficiently. By shifting the prudence evaluation to the first period, the regulator can reduce the firm's uncertainty and reduce the rate of return required to induce the firm to invest efficiently. Since the prudence evaluation is supposed to be based only on information available to the firm in period one, advancing the evaluation to the first period should not affect the substance of the evaluation.

Substituting Commission Judgment for Utility Decision-Making

This approach shares a critical weak point with the Used and Useful policy. Instead of structuring an incentive system to induce the firm to utilize its valuable information resources to produce power efficiently, this policy substitutes commission judgment for firm judgment. The policy's success depends on the regulator's ability to determine what the efficient investment level should be. If the regulator is to be the primary decision-maker, regulatory resources probably should be increased and commission incentives should be examined closely to determine whether the commission's first priority is likely to be efficient investment.

Like the Used and Useful policy, the Prudent Investor approach is unlikely to yield efficient investment by the firm. The structure of rate of return regulation focuses on current rates and does not appear to be well suited to addressing the complex questions involved in ensuring an optimal investment policy. This policy must encompass trade-offs between a range of different types of risks as well as trade-offs between capital and operating costs. Since the substantial cost increases for some types of plants place new importance on the quality of these decisions, the possibility of addressing these issues through deregulation may be very interesting.

7. INCREASING THE ROLE OF MARKET FORCES

Initial Steps are Under Way

Regulating public utilities to promote the public interest is not a straightforward task. To set optimal rates, the regulator must weigh a wide range of factors including the distribution of risk, incentives to undertake investment programs for efficient power generation, system reliability, conflicting forecasts for fuel prices and for consumer demand, and the importance of flexibility vs. minimum expected cost. The current situation in which a number of utilities are completing costly and unnecessary power plants has focused attention on the complexity of these issues. Neither the Used and Useful nor the Prudent Investor criteria for evaluating new investment are likely to offer a solid framework to deal with these issues.

One alternative is to increase the role of market forces in the determination of utility rates. Reliance on market forces may provide utilities with a better incentive structure: when investors' returns are at risk, powerful incentives motivate the investors to plan wisely. The regulated firm's incentive structure focuses on investing capital to earn profit on the difference between the cost of capital and the allowed rate of return. The unregulated firm, on the other hand, earns profits by building plants that minimize capital *and* operating cost and selling the power at the market rate. Inefficient plants will not earn profits in a competitive market.

One important requirement for this system to work is competition among enough firms to avoid the problems associated with monopoly power. For this reason, the possibility of increasing the role of market forces is generally considered only for power generation. Transmission and

distribution of power would continue to be regulated. Studies evaluating the potential for effective competition among power generating companies are controversial and the results are very sensitive to the underlying assumptions. Nonetheless, some changes have already been made within the existing regulatory structure to increase the role of market forces in the market for power generation. First, computerized spot markets have developed in some regions to facilitate extensive and efficient sale of power between interconnected power companies. Prices vary throughout the day depending on supply and demand for excess power.

Second, generation of power by private companies for sale to utilities has increased dramatically in response to the federal Public Utility Regulatory Policies Act of 1978. This law requires utilities to purchase power at regulated rates from cogenerators. The Federal Energy Regulatory Commission requires states to set the rate equal to the utility's avoided cost. This can include the utility's capital savings as well as fuel savings if the utility avoided constructing new facilities by purchasing the cogenerated power. One analyst concludes that twenty-three states follow these guidelines, while the policies in the remaining states vary widely. Even within these guidelines, the concept of avoided cost leaves considerable room for state regulatory discretion. The proportion of cogenerated power therefore varies widely across the nation. While the proportion of all power provided by cogenerators is small, probably 2-3 percent, cogenerators in California provide power equivalent to the output of fourteen large nuclear plants, and Houston Power and Light is estimated to purchase 13 percent of its power from private cogenerators.

Potential for an Expanded Role

This limited role of market forces may be extended in two directions: extending avoided cost pricing to utility-owned power plants, or expanding the role for private power generation. A preliminary decision by the California Public Utility Commission would extend the concept of avoided cost pricing to a utility-owned power plant. This represents a radical departure from the traditional regulatory practice of setting rates to ensure a reasonable rate of return for investors. This approach to pricing is also termed "value-based" pricing, which emphasizes the market-orientation of the approach. Widespread use of avoided cost or value-based pricing transfers the risk of high average total cost due to slack demand from consumers to investors. It also opens the door to the possibility of higher prices if demand increases sharply enough to require additional capacity in the future.

Nevada and Texas provide two examples of policies that expand the potential role for private companies to generate and sell power. The 1985 Nevada legislature enacted SB490 to remove restrictions from private power generation. A non-utility can now obtain a permit to construct a power plant without demonstrating the need for the facility, whereas a utility must demonstrate need before obtaining the permit. The private company must offer to sell the power to the local utility company, but if the offer is refused, the company may export the power.

Private power generation has also been increasing in Texas, for some petrochemical companies on the Texas Gulf Coast are major cogenerators. Some coastal cogenerators currently sell power several hundred miles away in Dallas and Fort Worth, paying rental fees to the utilities for use of the transmission lines. Allowing private companies to use utility lines for long-distance power sales increases the potential profit for major cogenerators by substantially enlarging their market area. Thus far, the private companies have only been permitted to sell this power to utilities. Expanding this arrangement to permit large cogenerators to utilize utility transmission lines to sell power directly to power users would represent a significant increase in competition for utilities; regulators are not yet ready to take this step.

Limitations

Developments in utility regulation may be very interesting for the next few years as the role of market forces is tested and revised. Strains typically appear wherever boundaries are drawn between regulation and the market. Such stress often leads to pressure to shift the boundary by either extending regulation or increasing reliance on market forces. For example, if the Gulf Coast cogenerators were permitted to sell power directly to customers, two issues would arise. First the regulator would have to define the conditions and terms under which the utility must allow private use of their transmission facilities. Second, the cogenerator is likely to sell to large customers with relatively stable requirements. Loss of such customers by the utility may increase the average cost of serving the remaining customers, thus pushing up rates in the regulated sector.

References

Averch, H., and L.L. Johnson. "Behavoir of the Firm Under Regulatory Constraint." *The American Economic Review*, vol. 52, no. 5 (Dec. 1962), 1053-1069.

Burns, R.E., K. Kelly, R.D. Poling, and M.J. Whiniham. "The Prudent Investment Test in the 1980s." *National Regulatory Research Institute*, April 1985.

"Electric Power Supply and Demand for 1985-1994." *North American Electric Reliability Council*, 1985.

Raffiee, Kambiz, and Jeanne Wendel. "The Effects of Alternate Regulatory Policies on Utility Investment Strategies." Working Paper #86-3, *Bureau of Business and Economic Research*, University of Nevada-Reno, Reno, Nevada, 1986.

APPENDIX 1

In this Appendix we present the behavior of the changes in nominal average price, rate of capacity utilization, and nominal fuel cost of the electric utility industry in the State of Nevada and contrast them with the national figures over the period 1951 to 1980. A similar type of analysis is also being done for the sub-periods before and after the energy crisis during 1973 through 1975.

The average annual growth rates of each of these variables are presented in Table 2. The rates of growth of average price and fuel cost in Nevada exceed the comparable national growth rates for the period 1951 to 1980. The

growth-rate differential is much higher for fuel cost than for average price: 2.64 and 0.46, respectively. A similar growth-rate differential characterizes fuel cost in Nevada as compared to the national figure in both the pre- and post-energy-crisis periods. The figures of growth rate of average price in Nevada are rather mixed as compared to the national figures in both of the sub-periods. Nevada experienced a reduction of 0.22 percent in average price during the 1951 to 1972 period, which is approximately half the national figure of -0.45 percent in the same period. It is interesting to note that the average annual growth of average price in the post-energy-crisis period is almost the same in both the U.S. and Nevada as opposed to the pre-energy-crisis period.

TABLE 2

The Average Annual Growth Rates of Nominal Average Price, Rate of Capacity Utilization, and Nominal Fuel Cost for the U.S. and Nevada

		1951-1980	1951-1972	1976-1980
Average Price:	US	2.32	0.45	10.55
	NV	2.78	—0.22	11.90
Rate of Capacity	US	—0.39	—0.14	—0.47
Utilization:	NV	—0.73	—0.15	—2.02
Fuel Cost:	US	5.82	0.18	12.51
	NV	8.46	3.31	14.36

Notes: (1) All prices and costs represent nominal figures. (2) The growth rates are the regression of estimates of the slope coefficients in the regressions of the natural logarithm of each variable against time. Variables definition and their sources are given in Appendix 2.

On the other hand, the mean and standard deviation of nominal average price and nominal fuel cost in the U.S. and Nevada, given in Table 3, indicate a very close pattern for the entire period of 1951 to 1980. In fact, the t-values for the null hypothesis of no difference between the means are 0.55 for nominal average price and 1.03 for nominal fuel cost, which are both insignificant for any distributional differences in nominal average price and nominal fuel cost in the samples of observations for the U.S. and Nevada.

TABLE 3

Mean and Standard Deviation of Average Price, Rate of Capacity Utilization, and Fuel Cost for the U.S. and Nevada; 1951-1980

		Mean	S.D.
Average Price:	US	2.047	0.7658
	NV	1.9303	0.8771
Rate of Capacity	US	0.4609	0.0261
Utilization:	NV	0.5021	0.1401
Fuel Cost:	US	0.5630	0.4988
	NV	0.4330	0.4811

Notes: See notes on Table 2.

The situation for the analysis of the behavior of the growth rate of capacity utilization (RCU) in Nevada and the U.S. is rather interesting. First, the growth rate of RCU declined for the periods of 1951-1980, 1951-1972, and 1976-1980. The decline for Nevada in the post-energy-crisis is rather substantial and is four times larger than the figure for the U.S. The growth rate decrease of RCU in Nevada is 1.8 times higher than the national figure for the 1951-1980 period. Second, as shown in Table 3, the variability of RCU in Nevada is five times larger than the national figure. This is mainly the result of a substantial increase in both net generation and installed generating capacity caused by the emergence of the Southern Nevada Power Company in 1955. Third, the correlation coefficient between average price and rate of capacity utilization is -0.8507 for the U.S. as compared to a nonsignificant value of -0.0822 for Nevada for the period of 1951 to 1980. Finally, the correlation coefficient between RCU and fuel cost is -0.8473 for the U.S as compared to a nonsignificant value of -0.1362 for Nevada for the entire period of 1951 to 1980. These last two points indicate the erratic behavior of rate of capacity utilization in Nevada, as was pointed out earlier.

APPENDIX 2

In this appendix, the data and variable construction used in this study are explained. Nominal average price (AP) of electricity is the ratio of total revenues from the sales of electricity to ultimate customers to the total kwh sales of electricity to ultimate customers. The measure of average price is in cents per kwh. The measure of nominal fuel cost (FC) is a composite average of coal, oil, and gas costs and is calculated in cents per net kwh. Due to lack of available data, we used the fuel cost for the west south central region as a proxy for that in the state of Nevada. The accuracy of this measure was checked by calculating the correlation coefficient between the available fuel cost measures for the west south central region and Nevada for various years, and they all turned out to be statistically significant. The other variable, rate of capacity utilization (RCU), was obtained as follows. First, the total installed generating capacity (IGC) of the electric utility industry (kw) was multiplied by 8,760 (the number of hours in a 365 day year). The product of this computation provides the potential number of kilowatt hours that the electric utility industry could have generated if its capacity had been fully utilized during a whole year without delay time for maintenance or repairs and with no account of demand conditions. Second, to determine the extent to which the potential capacity was utilized, the rate of capacity utilization was calculated by dividing the total potential capacity of the electric utility industry into the number of kilowatt hours actually generated (EG) by the electric utility industry.

The data on the variables for the U.S. were obtained from *Statistical Year Book of the Electric Utility Industry*, published by Edison Electric Institute. The data on the variables for Nevada were obtained from *Statistics of Privately Owned Electric Utilities in the United States*, published by the Federal Power Commission (1951-1975) and the U.S. Department of Energy (1976-1980).

Forecasting Nevada's Economy

by Thomas F. Cargill and Steven A. Morus

Nevada has been one of the fastest growing states in terms of employment for the past three decades. Some of its observers, especially those who portray gaming as a panacea for local employment and fiscal problems, claim that the state's gaming-based economy insulates it from swings in the national economy while providing a stable source of revenue to finance state and local government spending.

Policymakers in Nevada, however, are finding evidence that their state is growing more sensitive to the national economy. For example, fluctuations in the unemployment rate have closely matched movements in the national rate (see Chart). The state government also is feeling increasing pressure to finance an infrastructure to support rapid population growth and a more diverse regional economy. Like their counterparts in other states, Nevada's policymakers are realizing that the uncertainties of future economic performance require a better understanding of the structure of their state's economy and how that economy is interrelated with the nation's. In particular, they have found a need to forecast key economic variables.

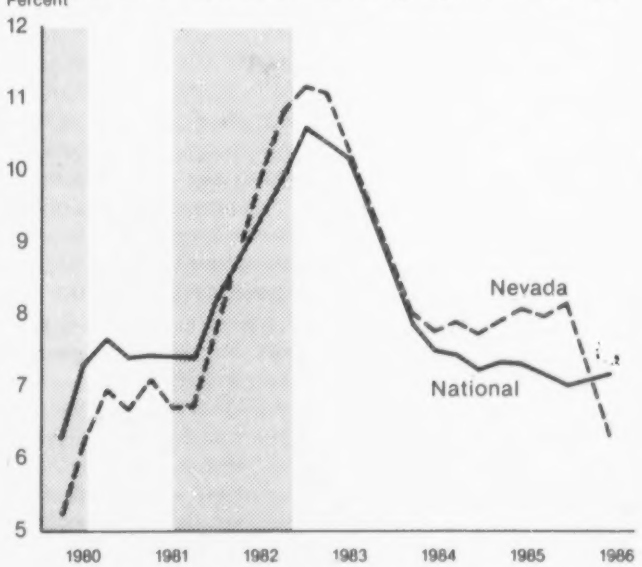
In this Letter, we first describe the structure of Nevada's economy and demonstrate its sensitivity to movements in the national economy. Then we describe past efforts to model and forecast Nevada's economy and present a new approach with a number of advantages over past efforts.

STRUCTURE OF NEVADA'S ECONOMY

Nevada's gaming-based economy was established by legislation in 1931 that permitted casino gaming statewide. Not until after World War II, however, did the gaming industry come to dominate the state's economy. Estimates indicate that gaming activity now directly and indirectly accounts for over 60 percent of Nevada's employment. Gaming tax revenues provide about 45 percent of state revenues to the general fund in any given year. The dominant role of gaming and the tourist orientation of Nevada's economy sharply differentiates it from other regions. In July 1985, the hotel-gaming-recreational sector in Nevada accounted for 28.8 percent of total nonagricultural employment.

Editor's Note: This paper originally appeared as a Federal Reserve Bank of San Francisco Weekly Letter, September 19, 1986 and is reprinted with the permission of the Federal Reserve Bank.

Nevada and National Unemployment Rates



* Seasonally adjusted and quarterly averaged. Shaded areas represent recessions.

Three characteristics unique to Nevada's economy make it interesting to the regional economist. First, the state is less diversified than most other states and remains highly dependent on the gaming industry as its economic base. Second, the uneven geographic distribution of economic activity presents policymakers with a set of problems that are simultaneously urban and rural. Despite the physical size of the state, population and economic activity are concentrated in three economic regions: Las Vegas (Clark County), Reno-Sparks (Washoe County), and South Lake Tahoe (Douglas County and Carson City). In 1985, these three regions accounted for 55.8 percent, 27.6 percent, and 6.0 percent of the state's total nonagricultural employment, respectively.

Third, the state has grown quickly as a result of the rapid growth of the gaming industry. Between 1960 and 1985, total civilian employment rose at an average annual rate of 5.5 percent compared to the 2.0 percent rate for the United States. Nevada continues to grow faster than most regions in the U.S. and is projected to do so through the end of the century.

Employment in the hotel-gaming-recreation sector increased at an average annual rate of 6.6 percent over the 1960-85 period. There is evidence, however, that the gaming industry has reached a stage of slower growth in Nevada because of market saturation and competition from other parts of the country. Casino gaming in Atlantic City and a variety of state lotteries such as the one recently introduced in California now compete for the consumer's gaming dollar.

Nevada is recognizing that gaming can no longer sustain future growth and that a narrowly diversified economy presents high risks. As a result, both the governmental and private sectors have mounted major efforts to encourage non-gaming business activity and to diversify the state's economy. A state-sponsored trade mission in April 1986 to Japan and Korea is the most recent example of this diversification effort.

NEVADA AND THE NATIONAL ECONOMY

Nevada's rapid growth during the 1970s was responsible for an oft-expressed view that a gaming-based economy is "recession proof." This view undoubtedly accounts for part of the interest other areas of the country have expressed in gaming as a solution to their employment and fiscal problems. Taxpayer efforts to limit local taxes, such as Proposition 13 in California, as well as federal spending cuts that have reduced funding for state programs, have created a restrictive fiscal environment for local and state governments. There are however, reasons to doubt the effectiveness of the gaming industry as a stable alternative source of government revenue.

The demand for Nevada's gaming services depends heavily on the economic performances of California and other areas which themselves are sensitive to changes in the national environment. Moreover, construction plays an important role in a rapidly growing economy such as Nevada's, and construction activity is sensitive to national financial conditions. Research by Thomas F. Cargill in 1979, based on industrial employment trends through 1975, suggested that Nevada's economy was indeed sensitive to the national business cycle, although not as sensitive as most other regions because of its strong growth trend. Since then, the sharp national recession between July 1981 and November 1982 was clearly reflected in economic activity in Nevada as the state's unemployment rate rose from 6.7 percent to 10.8 percent. This evidence certainly suggest that Nevada is not isolated from national economic forces.

FORECASTING NEVADA'S ECONOMY

As Nevada continues to grow in size and diversity, the need to forecast key economic measures has become critical. Recently, movements in the state's unemployement rate have fallen out of step with the national trend (see Chart). How much longer this can continue is a case in point. Nevada's policymakers would also like to forecast the amount of revenue realizable from gaming taxes and monies that could support investments in economic infrastructure.

The construction and estimation of an economic model provides a widely used method for making the needed forecasts. A model of a state economy consists of a set of relationships among selected variables that measure and determine key elements of the state economy. The framework used is determined by the model's purpose, the availability of data, and the amount of detail analyzed.

Regional forecasting models have proliferated since the early 1960s. These models have been developed for cities, SMSAs, counties, states, and groups of states, and have often been the focal points of public debate and policy formulation. Nevada has not been an exception to this development.

In the past decade, several attempts have been made to model the Nevada economy using traditional methods of model construction, estimation, and forecasting. At least one large multi-equation model was developed based on the framework commonly used in large national models. Other modeling approaches developed specifically for the regional context also were developed.

Unfortunately, many modeling efforts proved unsatisfactory. The data requirements were often so specific and detailed that models frequently were incapable of taking into account the changes in economic structure that accompany rapid growth. They were expensive to construct and maintain, and their forecasting performances left something to be desired given their costs of construction and maintenance. Moreover, the models became obsolete soon after they were constructed.

Dissatisfaction with efforts to forecast Nevada's economy reflects a growing more general dissatisfaction with traditional models, especially large models of the national economy. Errors from these models often are so large that forecasts are no more accurate than those obtained from "naive" methods.

A NEW APPROACH

The last few years have witnessed the emergence of a new approach to modeling and forecasting that offers a great advantage at the regional level. The vector autoregression, or VAR, method departs from the traditional multiequation structure of large models. It does not rely on a detailed specification of how each variable is determined by other variables and, hence, is less structured. The VAR method uses only a small group of variables (referred to as a vector of variables)—those considered most relevant to the purpose at hand.

In the case of Nevada, two sets of variables constitute the vector. First, three variables represent key measures of economic activity: total civilian employment, taxable sales, and "gross gaming revenues." Gross gaming revenues are the net winnings of gaming operations and, together with taxable sales, provide the major tax base for the state. Second, four national variables represent influences on Nevada's economy: real GNP, the GNP price index, total civilian employment, and the 3-month Treasury bill rate.

The VAR approach is flexible in that it allows the modeler to impose prior beliefs about how the selected variables interact with one another. If, for example, the modeler believes that real GNP plays a more important role in influencing gross gaming revenues than taxable sales, this belief can be made part of the VAR estimation process. Their simplicity makes VAR models less expensive to develop and maintain than traditional large-model methods, and allows them to be run on a personal computer.

The Nevada model is only one of several applications of the VAR method. VAR has already been applied to forecasting national and regional economic activity by economists at the Federal Reserve Banks of Dallas, Minneapolis, and Richmond. Some VAR modelers claim that the method yields as accurate, if not more accurate, forecasts than traditional methods, although this assertion has not been tested extensively to date. One comparison of the forecasting performance of a national VAR model with several well-known traditional models yielded mixed results, but VAR modelers consider even mixed results to favor the VAR method given its lesser cost and greater flexibility.

The VAR approach is not without limitations. It is designed primarily to generate forecasts and is not as suitable as traditional methods for testing specific theories of how, for example, real GNP influences taxable sales in the case of Nevada. VAR modelers argue, however, that our data and knowledge of the economy are not precise enough to specify how variables interact with other variables anyway.

CONCLUSIONS

Initial forecasts of Nevada's economy using the VAR method appear promising. We estimated a VAR model based on quarterly data from 1960 through 1982. Based on these estimates, forecasts of the three key Nevada variables were generated over the next eight quarters to gain some insight into the forecasting accuracy of the model. The average values of the absolute forecast error for gaming revenues, taxable sales, and employment were 3.71 percent, 1.19 percent, and 2.14 percent, respectively. The absolute forecast errors for 1984 averaged 6.95 percent, 6.65 percent, and 3.48 percent, respectively. These are acceptable forecast errors and justify continued work to refine the Nevada VAR model.

Despite its limitations, therefore, the VAR method offers a new approach to modeling the regional economy that has much promise. It gives policymakers a simpler, more flexible, and lower cost method of forecasting the economy.

THE BUREAU OF BUSINESS AND ECONOMIC RESEARCH

of the

UNIVERSITY OF NEVADA-RENO

in conjunction with

GAMING AND WAGERING BUSINESS MAGAZINE

THE SOCIETY FOR THE STUDY OF GAMBLING (LONDON)

and

THE NATIONAL ASSOCIATION FOR GAMBLING STUDIES (SYDNEY)

is organizing

THE SEVENTH INTERNATIONAL CONFERENCE ON

GAMBLING AND RISK TAKING

to be held at

BALLY'S HOTEL AND CASINO

RENO, NEVADA

AUGUST 23 TO 26, 1987

This conference will bring together experts from academic institutions, commercial gambling industries, regulatory authorities, governments, and the professions from the United States and throughout the world to address issues and questions of interest and importance to the activity of gambling. It will deal with a broad range of topics, including business, economic, social and political aspects of gambling in modern society.

Individuals interested in participating in the Conference, who would like to attend, or who would like further information, should contact the Bureau at 702-784-6887, or write:

Seventh International Conference on Gambling and Risk Taking
Bureau of Business and Economic Research
University of Nevada-Reno
Reno, Nevada 89557-0016

Nevada Economic Indicators
Statewide Statistical Data

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
Total Labor Force (000's)	502.6	506.3	508.9	505.9	– .6	+ 1.2
Total Employment (000's)	461.1	464.9	470.9	465.6	– .3	+ 2.2
Unemployment (000's)	41.5	41.4	38.0	40.3	– 2.7	– 7.2
Unemployment Rate	8.3	8.2	7.5	8.0	– 1.6	– 8.0
Unemployment Rate (Seasonally Adjusted)	7.4	7.4	7.1	7.3	– 10.6	– 8.0
Agricultural Empl. (000's)	4.1	4.1	5.0	4.4	– 5.7	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	447.2	449.1	451.2	449.2	– .5	+ 4.0
Mining	6.1	6.1	6.2	6.1	– 8.9	+ .5
Contract Construction	22.3	22.5	23.0	22.6	– 6.1	+ 7.8
Manufacturing	21.9	22.1	22.2	22.1	+ 2.3	+ 2.5
Transportation & Utilities						
Transportation	14.1	14.4	14.7	14.4	+ .9	+ 6.9
Railroads	1.3	1.3	1.3	1.3	– 4.9	– 7.1
Air	3.1	3.2	3.3	3.2	+ 11.6	+ 11.6
Public Utilities	11.2	11.2	11.1	11.2	– 2.0	– .6
Total Trade	92.5	91.9	91.9	92.1	– 1.0	+ 5.5
Wholesale Trade	15.9	15.9	15.9	15.9	+ 1.7	+ 4.6
Retail Trade	76.6	76.0	76.0	76.2	– 1.6	+ 5.7
Finance, Ins., Real Estate	22.3	22.4	22.4	22.4	+ 3.5	+ 8.8
Service Industries	197.1	196.7	197.7	197.2	+ .1	+ 3.7
Hotels, Amusement and Recreation Combined	122.7	123.4	124.2	123.4	– 1.2	+ 1.6
Medical and Health	19.1	19.1	19.1	19.1	+ 7.1	+ 16.7
Total Government	59.7	61.8	62.0	61.2	– .8	+ 1.2
Federal	10.4	10.4	10.4	10.4	+ .3	+ 3.0
State and Local	49.3	51.4	51.6	50.8	– 1.0	+ .8
Education	22.1	23.9	24.1	23.4	– 1.1	+ 6.1
Average Weekly Earnings in Selected Industries						
Mining	602.55	571.46	584.27	586.95	+ 5.2	+ 6.3
Construction	607.39	585.48	568.89	587.25	+ 3.0	– 2.1
Manufacturing	363.40	348.69	362.98	358.36	– 3.6	– .5
Public Utilities	569.61	528.54	542.17	546.77	+ 2.3	+ 11.1
Trade	285.03	280.69	283.57	283.10	+ .8	+ 3.6
Average Weekly Hours in Selected Industries						
Mining	43.6	41.5	42.4	42.5	– .4	– .7
Construction	36.7	35.7	35.6	36.0	+ 3.6	+ 1.4
Manufacturing	39.5	38.7	39.8	39.3	– 2.8	– 1.4
Public Utilities	42.1	39.8	40.4	40.8	– .4	+ 1.7
Trade	34.3	33.1	33.4	33.6	– .7	– .2
Average Hourly Earnings in Selected Industries						
Mining	13.82	13.77	13.78	13.79	+ 5.6	+ 7.0
Construction	16.55	16.40	15.98	16.31	– .5	– 3.5
Manufacturing	9.20	9.01	9.12	9.11	– .8	+ 1.0
Public Utilities	13.53	13.28	13.42	13.41	+ 2.7	+ 9.1
Trade	8.31	8.48	8.49	8.43	+ 1.5	+ 3.9

Statewide Statistical Data (Continued)

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
Construction Activity						
Residential ($000's)	51,500	36,200	61,800	149,500	– 36.6	– 24.0
Nonresidential ($000's)	33,900	14,900	32,000	80,800	– 49.4	+ 19.2
Nonbuilding ($000's)	2,000	2,600	21,600	26,200	– 54.9	– 43.3
Total ($000's)	87,500	53,700	15,400	156,600	– 65.5	– 49.6
# of New Dwelling Units	839	645	1,043	2,527	+ 23.2	+ 10.9
Tax Collections ($)						
Liquor	883,042	826,944	860,931	2,570,917	– 30.3	– 8.1
Cigarette	1,519,204	1,616,221	1,444,536	4,579,961	– 5.6	+ 4.2
Fuel	4,059,335	3,948,573	3,545,223	11,553,131	– 5.9	+ 13.2
Quarterly Taxable Sales ($000's)	–	–	–	2,006,609	– 8.6	+ 7.8
Quarterly Gaming Revenues ($000's)	–	–	–	884,674	+ 15.4	+ 8.9
Highway Traffic Flow						
17 Selected Stations (Avg. Daily)	95,042	95,177	100,794	97,004	– 8.2	+ .1

† Revised.

Las Vegas Standard Metropolitan Statistical Area

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
Total Labor Force (000's)	290.2	291.3	292.6	291.4	+ 1.1	+ 1.9
Total Employment (000's)	266.4	268.0	270.8	268.4	+ 1.9	+ 3.4
Unemployment (000's)	23.8	23.3	21.8	23.0	– 7.3	– 8.9
Unemployment Rate	8.2	8.0	7.4	7.9	– 8.5	– 10.6
Unemployment Rate (Seasonally Adjusted)	7.8	7.6	7.4	7.6	– 10.2	– 10.2
Agricultural Employment (000's)	1.0	1.0	1.2	1.1	+ 18.5	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	258.1	258.2	259.3	258.5	+ 1.2	+ 5.1
Mining	.3	.3	.3	.3	– 0.0	+ 0.0
Contract Construction	7.9	8.0	8.1	8.0	– 36.2	+ 6.7
Manufacturing	7.9	8.0	8.1	8.0	+ 3.4	+ 6.7
Transportation & Utilities						
Transportation	8.3	8.5	8.6	8.5	– .4	+ 5.4
Railroads	.4	.4	.4	.4	– 14.3	– 20.0
Air	2.3	2.4	2.4	2.4	+ 9.2	+ 6.0
Public Utilities	6.1	6.0	6.1	6.1	– .5	+ 1.1
Total Trade	53.8	53.8	53.8	53.8	+ .7	+ 6.8
Wholesale Trade	8.5	8.5	8.6	8.5	+ 5.8	+ 7.6
Retail Trade	45.3	45.3	45.2	45.3	– .2	+ 6.7
Finance, Ins., Real Estate	13.4	13.5	13.4	13.4	+ 4.7	+ 9.2
Service Industries	124.0	122.8	123.4	123.4	+ 1.9	+ 3.3
Hotels, Gaming & Recreation	78.2	78.2	78.8	78.4	+ 1.9	+ 2.3
Total Government	24.5	25.3	25.4	25.1	– 13.0	+ 5.6
Federal	5.6	5.6	5.6	5.6	– .6	+ 6.3
State and Local	24.5	25.5	25.4	25.1	+ .4	+ 5.6
Education	11.4	12.1	12.2	11.9	– 1.7	+ 8.2
Construction Activity						
Las Vegas						
Residential ($000's)	13,355	19,381	20,983	53,719	+ 56.6	+ 94.9
Nonresidential ($000's)	10,773	5,081	20,791	36,645	+ 8.4	+ 35.4
Total Value ($000's)	24,128	18,467	41,773	84,368	+ 25.7	+ 54.4
# of New Family Units	300	335	609	1,244	+ 32.1	+ 51.7
North Las Vegas						
Residential ($000's)	970	90	932	1,992		
Nonresidential ($000's)	6,958	1,001	508	8,467		
Total Value ($000's)	7,928	1,091	1,440	10,459		
# of Permits	16	1	12	29		
Quarterly Taxable Sales ($000's)	–	–	–	1,135,190	– 5.1	+ 56.0
Quarterly Gaming Revenues ($000's)	–	–	–	600,271	+ 11.4	+ 4.6
Air Transportation-McCarran						
Passengers (Arr. & Depart.)	909,243	1,017,767	1,178,936	3,105,946	+ 11.4	+ 13.8
Cargo Enplaned (lbs.)	1,104,875	1,594,370	2,078,773	4,778,018	+ 33.2	+ 3.5
Cargo Deplaned (lbs.)	2,103,849	2,428,853	2,997,463	7,530,165	+ 17.0	+ 5.1
Highway Traffic Flow						
4 Selected Stations (Avg. Daily)	30,030	30,814	31,497	30,780	– 3.0	+ 2.9
Room Tax ($)						
Clark County	1,818,773	2,096,446	2,529,156	6,444,375	+ 8.2	+ 8.8
Las Vegas City	282,727	310,877	357,695	951,299	+ 4.0	+ 7.7
SMSA Total	2,112,992	2,417,989	2,898,323	7,429,304	+ 7.6	+ 8.7

†Revised.

Reno Standard Metropolitan Statistical Area

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
Total Labor Force (000's)	126.0	128.5	128.5	127.7	– 5.8	+ .4
Total Employment (000's)	116.3	118.4	119.8	118.2	– 6.3	+ .7
Unemployment (000's)	9.7	10.1	8.7	9.5	+ 1.1	– 3.4
Unemployment Rate	7.7	7.9	6.8	7.5	+ 7.7	– 3.4
Unemployment Rate (Seasonally Adjusted)	6.3	6.7	6.1	6.4	– 12.0	– 3.5
Agricultural Employment (000's)	.5	.5	.6	.5	– 5.9	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	120.0	121.3	121.8	121.0	– 2.7	+ 2.6
Mining	.6	.6	.6	.6	– 25.0	– 14.3
Contract Construction	5.5	5.5	5.6	5.5	– 7.8	+ 7.1
Manufacturing	8.0	8.0	8.0	8.0	– .6	– 5.1
Transportation & Utilities						
Transportation	4.2	4.3	4.4	4.3	+ 3.2	+ 7.5
Railroads	.4	.4	.4	.4	+ 0.0	+ 0.0
Public Utilities	3.8	3.8	3.8	3.8	– 5.0	– 2.6
Total Trade	27.7	27.2	27.5	27.5	– 1.9	+ 3.9
Wholesale Trade	6.4	6.4	6.5	6.4	– 1.0	+ 6.6
Retail Trade	21.3	20.8	21.0	21.0	– 2.2	+ 3.1
Finance, Ins., Real Estate	6.6	6.6	6.6	6.6	– .5	+ 5.9
Service Industries	48.5	49.2	49.2	49.0	– 2.9	+ 6.9
Hotels, Gaming & Recreation	27.6	28.2	28.2	28.0	– 7.7	+ .6
Total Government	15.1	16.1	16.1	15.8	– 2.7	– 8.7
Federal	2.9	2.9	2.9	2.9	+ 4.8	+ 0.0
State and Local	12.2	13.2	13.2	12.9	– 4.2	– 10.4
Education	6.8	7.6	7.6	7.3	– 1.3	+ 3.3
Construction Activity						
Reno						
Residential ($000's)	4,084	1,071	10,772	15,927	– 33.1	+ 5.6
Nonresidential ($000's)	6,613	1,657	23,218	31,488	+ 127.6	+ 209.4
Total Value ($000's)	10,697	2,728	33,990	47,415	+ 26.0	+ 87.7
# of New Family Units	60	17	295	372	– 26.3	+ 36.3
Sparks						
Residential ($000's)	1,216	1,324	2,767	5,307	+ 80.1	– 72.2
Nonresidential ($000's)	2,475	2,197	963	5,635	– 70.4	– 1.5
Total Value ($000's)	3,691	3,521	3,730	10,942	– 50.2	– 55.9
# of New Family Units	13	28	62	103	+ 60.9	– 85.2
Washoe County (Unincorporated)						
Residential ($000's)	2,062	1,941	4,849	8,852	– 15.3	– 36.7
Nonresidential ($000's)	579	876	646	2,101	– 56.6	– 67.8
Total Value ($000's)	2,641	2,817	5,495	10,953	– 28.4	– 46.6
# of New Family Units	24	20	41	85	– 24.1	– 56.9
Quarterly Taxable Sales ($000's)	–	–	–	452,284	– 13.8	+ 4.5
Quarterly Gaming Revenues ($000's)	–	–	–	141,860	– .3	– .3
Air Transportation-Reno						
Passengers (Arr. & Depart.)	261,372	248,630	302,938	812,940	+ 27.4	+ 11.9
Cargo Enplaned (lbs.)	514,339	435,737	679,844	1,629,920	– 3.1	– 6.8
Cargo Deplaned (lbs.)	692,562	642,150	924,954	2,259,666	+ 10.9	+ 31.6
Highway Traffic Flow						
7 Selected Stations (Avg. Daily)	57,292	53,680	57,675	56,215	– 8.2	+ .1
Room Tax ($)						
Washoe County	88,244	65,957	66,438	220,639	+ 18.7	+ 5.3
Reno	443,129	509,646	511,905	1,464,680	– 39.4	– 1.4
Sparks	58,947	58,599	68,662	181,208	– 36.9	+ 30.5
SMSA Total	585,320	634,202	647,005	1,866,527	– 35.4	+ 1.8

† Revised.

Nevada Statistical Data by County

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
CARSON CITY						
Total Labor Force	19,350	19,540	19,480	19,456	– 4.5	– 2.2
Total Employment	17,640	17,730	17,820	17,730	– 5.6	– .4
Unemployment	1,710	1,810	1,660	1,726	+ 8.6	– 17.3
Unemployment Rate	8.8	9.2	8.5	8.8	+ 12.8	– 15.9
Construction Activity						
Residential Value ($000's)	2,078	1,342	2,269	5,689	– 25.4	+ 113.0
Nonresidential Value ($000's)	380	372	390	1,142	– 75.8	– 60.4
Total Value ($000's)	2,459	1,715	2,659	6,833	– 44.6	+ 23.0
# of New Family Units	26	20	36	82	– 22.6	+ 121.6
Quarterly Taxable Sales ($000's)	–	–	–	63,012	– 16.4	+ 4.4
Quarterly Gaming Revenues ($000's)	–	–	–	7,799	– 6.9	– 6.6
CHURCHILL						
Total Labor Force	6,330	6,430	6,550	6,436	– 2.3	– 1.3
Total Employment	5,640	5,720	5,860	5,740	– 2.9	+ .1
Unemployment	690	710	690	696	+ 2.5	– 12.9
Unemployment Rate	10.9	11.0	10.5	10.8	+ 4.5	+ 11.7
Construction Activity						
Residential Value ($000's)	666	131	437	1,234	+ 231.7	+ 97.4
Total Value ($000's)	666	131	437	1,234	+ 89.3	+ 78.1
# of New Family Units	8	1	6	15	+ 150.0	+ 66.7
Quarterly Taxable Sales ($000's)	–	–	–	21,567	– 17.5	+ 14.9
Quarterly Gaming Revenues ($000's)	–	–	–	0	–	–
DOUGLAS						
Total Labor Force	11,990	12,090	12,160	12,080	+ 15.2	– 3.3
Total Employment	11,090	11,140	11,320	11,183	+ 16.1	– 3.4
Unemployment	900	950	840	896	+ 4.3	– 2.2
Unemployment Rate	7.5	7.8	6.9	7.4	– 10.8	+ 1.4
Quarterly Taxable Sales ($000's)	–	–	–	52,566	+ 3.6	+ 1.5
Quarterly Gaming Revenues ($000's)	–	–	–	59,816	+ 11.2	– 7.6
ELKO						
Total Labor Force	12,100	12,270	12,350	12,240	– 9.6	+ .8
Total Employment	10,900	11,050	11,270	11,073	– 11.7	+ .1
Unemployment	1,200	1,220	1,080	1,166	+ 16.7	+ 8.4
Unemployment Rate	9.9	9.9	8.7	9.5	+ 27.2	+ 7.1
Construction Activity						
Elko City						
Residential ($000's)	70	48	411	529	– 21.5	+ 30.9
Nonresidential ($000's)	121	5	37	163	+ 61.4	+ 59.8
Total Value ($000's)	191	53	448	692	– 10.7	+ 36.8
# of New Dwelling Units	1	0	6	7	+ 0.0	+ 40.0
Quarterly Taxable Sales ($000's)	–	–	–	43,810	– 14.8	+ 11.3
Quarterly Gaming Revenues ($000's)	–	–	–	17,351	+ 13.6	+ 7.7
ESMERALDA						
Total Labor Force	710	710	710	71	+ 38.3	– 5
Total Employment	670	670	670	670	+ 42.6	+ 2.6
Unemployment	40	40	40	40	– 7.7	– 33.3
Unemployment Rate	5.2	5.5	6.1	5.6	– 37.3	– 35.6
EUREKA						
Total Labor Force	990	970	980	980	+ 9.7	+ 2.8
Total Employment	910	900	910	906	+ 10.6	+ 3.8
Unemployment	80	70	70	73	+ 0.0	– 8.3
Unemployment Rate	7.7	7.5	7.3	7.5	– 7.4	– 8.5

Nevada Statistical Data by County (Continued)

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
HUMBOLDT						
Total Labor Force	5,030	5,030	5,090	5,050	– 10.1	– 1.7
Total Employment	4,450	4,470	4,580	4,450	– 11.7	– 1.7
Unemployment	580	560	510	550	+ 5.8	– 1.8
Unemployment Rate	11.6	11.2	10.1	11.0	+ 17.1	+ .3
Quarterly Taxable Sales ($000's)	–	–	–	32,924	– 3.1	+ 76.9
Quarterly Gaming Revenues ($000's)	–	–	–	1,651	– 4.0	+ 2.8
LANDER						
Total Labor Force	2,210	2,290	2,290	2,263	– 1.5	+ 10.8
Total Employment	1,890	1,940	1,980	1,936	– 7.9	+ 4.5
Unemployment	320	350	310	326	+ 69.0	+ 71.9
Unemployment Rate	14.4	15.4	13.5	14.4	+ 69.8	+ 55.2
Quarterly Taxable Sales ($000's)	–	–	–	8,801	– .5	+ 21.1
LINCOLN						
Total Labor Force	2,110	2,130	2,140	2,126	– 18.1	+ 0.0
Total Employment	1,970	1,980	2,000	1,983	– 18.5	+ .8
Unemployment	140	150	140	143	– 12.2	– 10.4
Unemployment Rate	6.8	6.9	6.4	6.7	+ 6.9	– 11.1
Quarterly Taxable Sales ($000's)	–	–	–	1,497	+ 0.0	– 48.7
LYON						
Total Labor Force	9,200	9,310	9,450	9,320	+ 30.6	+ 7.4
Total Employment	8,290	8,860	8,560	8,570	+ 34.6	+ 9.1
Unemployment	910	950	890	916	+ 19.0	+ 11.8
Unemployment Rate	9.9	10.2	9.4	9.8	– 11.1	+ 3.9
Quarterly Taxable Sales ($000's)	–	–	–	13,934	– 1.3	+ 17.2
MINERAL						
Total Labor Force	3,030	3,060	3,040	3,043	– 10.7	+ 2.4
Total Employment	2,740	2,770	2,790	2,766	– 11.4	+ 3.0
Unemployment	290	290	250	276	– 2.4	– 3.5
Unemployment Rate	9.6	9.5	8.1	9.1	+ 7.5	– 6.2
Quarterly Taxable Sales ($000's)	–	–	–	5,382	– 17.6	+ 8.6
NYE						
Total Labor Force	6,770	6,770	6,820	6,786	+ 37.8	+ 0.0
Total Employment	6,250	6,240	6,330	6,273	+ 40.7	– 2.0
Unemployment	520	530	490	513	+ 10.8	+ 32.8
Unemployment Rate	7.7	7.9	7.2	7.6	– 23.2	+ 33.3
Quarterly Taxable Sales ($000's)	–	–	–	15,110	– 33.9	– 12.1
Quarterly Gaming Revenues ($000's)	–	–	–	1,590	+ 3.9	+ 17.7
PERSHING						
Total Labor Force	1,750	1,750	1,770	1,756	+ 1.5	+ 17.6
Total Employment	1,610	1,620	1,660	1,630	+ .8	+ 20.4
Unemployment	140	130	110	126	+ 11.8	– 9.5
Unemployment Rate	7.9	7.5	6.4	7.3	+ 10.7	– 21.6
Quarterly Taxable Sales ($000's)	–	–	–	3,248	– 8.4	+ 8.5

† Revised.

Nevada Statistical Data by County (Continued)

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
STOREY						
Total Labor Force	910	890	880	893	– 25.1	– 10.4
Total Employment	820	820	820	820	– 26.6	– 5.4
Unemployment	90	70	60	73	– 4.3	– 43.6
Unemployment Rate	9.6	8.1	6.8	8.2	+ 21.9	– 36.5
Quarterly Taxable Sales ($000's)	–	–	–	1,835	– 43.5	+ 0.0
Quarterly Gaming Revenues ($000's)	–	–	–	233	– 39.6	– 12.4
WHITE PINE						
Total Labor Force	4,090	4,100	4,170	4,120	+ 8.7	+ 3.6
Total Employment	3,660	3,680	3,770	3,703	+ 9.6	+ 12.9
Unemployment	430	420	400	416	+ 1.6	– 40.2
Unemployment Rate	10.4	10.3	9.6	10.1	– 6.5	– 42.4
Quarterly Taxable Sales ($000's)	–	–	–	9,095	– 25.7	+ 6.7
Quarterly Gaming Revenues ($000's)	–	–	–	439	– 11.1	+ 5.5

† Revised.

Selected U.S. Economic Indicators

Consumer Price Index & Indexes of Selected Categories
All Urban Consumers
(1967 = 100%)

	January 1986	February 1986	March 1986	1st Quarter 1986	PERCENT CHANGE 4th Quarter-1985 1st Quarter-1986	PERCENT CHANGE 1st Quarter-1985 1st Quarter-1986
All Items	328.4	327.5	327.0	327.6	+ .3	+ 3.2
Food	315.6	315.3	315.4	315.4	+ 1.3	+ 4.9
Housing	356.8	356.5	357.0	356.8	+ .5	+ 3.9
Apparel and Upkeep	205.0	204.1	206.3	205.1	– 2.5	+ .9
Transportation	323.9	319.2	309.6	317.6	– 1.6	+ .7
Medical Care	418.2	422.3	425.8	422.1	+ 2.3	+ 7.2

Producer Price Indexes for Selected Commodity Groupings
(1967 = 100%)

All Commodities	309.0	304.7	300.3	304.7	– 1.5	– 1.5
Fuel and Power	622.0	571.5	512.2	568.6	– 10.6	– 9.7
Machinery and Equipment	300.9	301.6	301.9	301.5	+ .5	+ 1.2
Metals and Metal Products	311.3	311.0	311.5	311.3	– .8	– 1.3
Nonmetallic Mineral Products	352.3	352.3	351.9	352.2	+ .4	+ 2.8
Textile Products & Apparel	210.6	210.8	211.1	210.8	+ .2	+ .2

U.S. Labor Force

Civilian Labor Force (000's)	115,431	115,725	116,309	115,821	– 1.7	+ 1.8
Total Employment (000's)	106,959	106,685	107,643	107,095	– .8	+ 2.1
Unemployment (000's)	8,472	9,041	8,667	8,726	+ 11.6	– 1.8
Unemployment Rate	7.3	7.8	7.5	7.5	+ 13.6	– 3.4
Unemployment Rate (Seasonally Adjusted)	6.7	7.8	7.2	7.2	+ 3.3	– 1.4

DATA SOURCES

Information for statistical tables were developed in cooperation with the following sources:

Airport Authority of Washoe County; Carson City Department of Public Works; Churchill County; City of Elko; City of Las Vegas, Nevada Building and Safety; City of North Las Vegas; City of Reno, Building and Safety Department; City of Sparks; Clark County Department of Aviation; Las Vegas Convention/Visitors Authority; Nevada Power Co.; Reno-Sparks Convention/Visitors Authority; State of Nevada Department of Taxation; State of Nevada Department of Transportation; State of Nevada Employment Security Department; State of Nevada State Gaming Control Board; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; Washoe County Building and Safety Division; White Pine County Regional Planning Commission.

Nevada Review of BUSINESS & ECONOMICS

University of Nevada-Reno
Joseph N. Crowley, *President*

College of Business Administration
Henry Amato, *Dean*

Bureau of Business and Economic Research
David R. Seymour, *Director*
Thomas F. Cargill, *Editor*

Research Staff:
Lynni Weibezahl

Staff:
Barb Glazner

Nevada Review of Business and Economics
A Quarterly Publication
(ISSN 0148-5881)

Copyright 1986 by
Bureau of Business and Economic Research
University of Nevada-Reno

POSTMASTER:

Please send Form 3759 to:

Bureau of Business and Economic Research
University of Nevada-Reno
Reno, NV 89557-0016

Phone: (702) 784-6877

Second Class Postage Paid at Reno, NV

Editorial Advisory Board

Glen Atkinson, Professor of Economics, University of Nevada-Reno, NV.

William Bible, Director, State of Nevada, Department of Administration, Carson City, NV.

William R. Eadington, Professor of Economics, University of Nevada-Reno, NV.

Kyung-Il (Ed) Ghymn, Professor of Managerial Sciences, University of Nevada-Reno, NV

Andrew Grose, Executive Director, State of Nevada, Commission on Economic Development, Carson City, NV.

Thomas Harris, Associate Professor of Agricultural Economics, University of Nevada-Reno, NV.

William S. Hallagan, Associate Professor of Economics, Washington State University, Pullman, WA.

Gary Horton, Financial Economist, Nevada National Bank, Reno, NV.

Michael C. Keeley, Senior Economist, Federal Reserve Bank of San Francisco, CA.

Robert A. Meyer, Jr., Associate Dean, School of Business Administration, University of California, Berkeley, CA.

Lee R. McPheters, Director, Bureau of Business and Economic Research, Arizona State University, Tempe, AZ.

Harold C. Nathan, Senior Financial Economist, Wells Fargo Bank, N.A., San Francisco, CA.

William J. Robinson, Director, Center for Business and Economic Research, University of Nevada-Las Vegas, NV.

Kambiz Raffiee, Assistant Professor of Economics, University of Nevada-Reno, NV.

John M. Strefeler, Associate Professor of Accounting and Information Systems, University of Nevada-Reno, NV.

Robert C. Weems, Dean Emeritus, College of Business Administration, University of Nevada-Reno, NV.

Sam E. White, Associate Dean of Undergraduate Programs and Associate Professor of Business Administration, Portland State University, Portland, OR.

Richard E. Wilson, Associate Professor of Economics, University of Nevada-Reno, NV.

Ted Mitchell, Associate Professor of Marketing, University of Nevada-Reno, NV.

Ted Cummings, Assistant Dean, College of Business & Economics, University of Nevada-Las Vegas, NV.

Gary Walton, Dean, Graduate School of Administration, University of California, Davis, CA.

James Hanna, State of Nevada, Employment Security Research, Carson City, NV.

CONTENTS

Manufacturing Employment Growth in Nevada 2
Kimberly S. Harris

Efficiency of State Retirement Systems in Four Western States 8
Ralph A. Pope

The Recent Development of the U.S.-China Trade 12
Kuo C. Tseng

In a Chinese Village 19
Hang-Sheng Cheng

A Salary Survey of CPA Firms in the Reno/Sparks Area 22
B.J. Fuller

Nevada Economic Indicators:
- Statewide Statistical Data 25
- Las Vegas SMSA Data 26
- Reno SMSA Data 27
- Nevada Statistical Data by County 28

Selected U.S. Economic Indicators 30

Announcement: The Seventh International Conference on Gambling and Risk Taking 31

General Editorial Policy

The *Nevada Review of Business and Economics* is a quarterly publication of the Bureau of Business and Economic Research, College of Business Administration, University of Nevada-Reno. Articles published in the *Review* are refereed and subject to United States copyright laws. The *Review* seeks to publish articles that focus on the business and economic environment of Nevada and the Western Region of the United States. Papers that focus on national or international topics will also be considered for publication if they either relate the topic to business and economic concerns of the Western Region or deal with a topic of sufficient interest to the Western Region. Papers can be nonquantitative or quantitative; however, in both cases, papers should focus on policy issues regarding the business and economic environment. In the case of quantitative papers, technical discussions should not be the focal point of the paper; and those cases where technical discussions are necessary, they may be more appropriately relegated to a technical appendix. The editorial policy of the *Review* is designed to reflect the interests of the readership which consists primarily of professionals in the business community, government officials and policymakers, and academics in Nevada and the Western Region of the United States. All manuscripts should be addressed to the Editor, *Nevada Review of Business and Economics*, Bureau of Business and Economic Research, University of Nevada-Reno, Reno, Nevada 89557-0016.

Manufacturing Employment Growth in Nevada

*by Kimberly S. Harris**

INTRODUCTION AND OBJECTIVES

During the 1970s and 1980s Nevada has been one of the fastest growing states in the nation. Concurrent with this rise in population, total industrial employment in Nevada increased 94 percent between 1970 and 1985 (Nevada Employment Security Department). Although the services industry has provided many new jobs during this period, steps are being taken to diversify the state's economy beyond the hotels-gaming-recreation sector because diversification is viewed as a guard against cyclical instability. Two reasons for the diversification effort in Nevada are: the 1981-1982 recession, which caused gaming employment growth to actually decline for the first time ever; and increased competition from legalized gaming in Atlantic City, New Jersey.

Government, industry, and education officials are working together to broaden the state's economic base. High technology manufacturing firms are targeted for diversification efforts, due to that industry's recent growth and potential for high wage employment. Light manufacturing firms and firms which would not deplete the state's limited natural resources are also being encouraged to locate in Nevada.

Although the share of total industrial employment obtained from manufacturing in Nevada is small, net manufacturing employment has risen during the past decade. Between 1974 and 1984, manufacturing employment rose from one-tenth of a percentage point to 4.9 percent of industrial employment, reaching 21,000 jobs statewide (Nevada Employment Security Department). Little data is available regarding the entry and exit of new firms during the period. However, questions about Nevada's manufacturing sector arise, such as: Have the majority of additional jobs been created by new firms, or by expansion of existing firms? In what industrial sector are most new manufacturing firms located? How and where should diversification efforts be targeted?

The objective of this paper is to examine job creation by new manufacturing firms in Nevada between 1974 and 1984. To achieve this objective, new manufacturing employment is analyzed using two methods. First, a description of new job creation by Standard Industrial Classification (SIC) is provided, and second, employment created by expanding firms is described. This descriptive information is followed by a detailed analysis based upon entropy results. Dispersions of new job growth with respect to SIC are defined using the entropy measure. Hypotheses with respect to changes in entropy measures over time are then statistically tested.

**Kimberly S. Harris is a former Research Associate, Division of Agricultural and Resource Economics, University of Nevada-Reno*

METHODOLOGY

The data source for this study is the quarterly record of employers covered by unemployment insurance laws in Nevada (Nevada Employment Security Department records). Because aggregate data on births and deaths of new firms is not currently available, historical firm employment data was gathered for the period 1974-1984. A new firm which has not previously operated in Nevada is termed a new business birth. A firm created through an acquisition or merger is not counted as a birth, when the transaction could be identified as such. Date of birth is based upon the year of the quarter in which an employer initially pays more than $225 in wages and becomes liable for Unemployment Insurance taxes. Many firms obtain an employer account number from the Nevada Employment Security Department but do not hire employees for a year or more. Thus, a birth is not counted until a firm hires employees. Average employment for the first quarter of each year is used. If a new firm opened later than the first quarter, employment was obtained for the beginning quarter of operation.

Data is grouped according to two-digit Standard Industrial Classification numbers, listed in Table 1. Several small SIC groups are combined for the entropy analysis. Included in one group are the nondurable goods categories, SIC 22, 26, 29, and 31. The second group is composed of the durable goods categories, SIC 33 and 37. The number of new jobs created by these classifications is too small for individual SIC analysis.

Entropy was first used to describe the disorder of a system in thermodynamics, while recent studies have used the technique to examine trends in industry. Entropy has been used by Smith and Weber (1984) to analyze differences between manufacturing and nonmanufacturing industry contribution to gross state product in examining Oregon's industrial diversification. These two authors conclude that Oregon's manufacturing firms exhibited a trend toward greater diversification after 1970. In Tennessee, Garrison (1974) found that both rural and urban counties exhibited increasing dispersion of new manufacturing firm employment. Blalock and Doeksen (1977), examining job growth by community population, report that dispersion of jobs created by new manufacturing plants in Oklahoma increased between 1963 and 1974.

The entropy technique compares the distribution of new firm employment in one industrial classification (SIC) against a rectangular distribution in which new firm employment is equally dispersed among all classifications. The entropy measure helps to determine whether new firm employment among SIC groups in the state has become more or less

evenly distributed over time, by providing a scale for defining equality of new firm employment. The greater the numerical value of the entropy measure, the greater the equality of new firm location among competing SIC groups.

In this paper, entropy is defined as:

$$-\sum_{j=1}^{n} \left(\frac{Y_{jit}}{Y_t}\right) \cdot \log \left(\frac{Y_{jit}}{Y_t}\right) \quad (1)$$

Where Y_{jit} is the i^{th} firm's share of new firm employment in industry sector n for Nevada in time period t; and Y_t is the total new firm employment in Nevada in time period t.

The entropy measure provides not only the degree of new firm growth equality between SIC groups, but it also can provide the equality of new firm location within industry subsets. For example, all new manufacturing firm employment in Nevada can be divided into fifteen industrial groups. The total employment share by industrial sector may be expressed as:

$$Y_g = \sum_{j=1}^{m} Y_{ji} \quad (2)$$

Where Y_{ji} is the individual firm's new employment; Y_g is the industrial sector's new employment; and m is the number of firms in each industrial sector. Each sector's relative share of total Nevada new employment may be expressed as:

$$Y_s = Y_g / Y_t \quad (3)$$

Where Y_s is the relative share of new employment for industrial grouping g as to total state new employment.

The entropy calculations may be better illustrated by an example. Suppose for our example that SIC 30, rubber and misc. plastic, is composed of two new manufacturers, Firm 1 and Firm 2.

Entropy equation (2) simply reflects the total new employment in SIC 30, where

Y_{ji} = Firm 1, Firm 2 new employment (emp.); (4)
and Y_g = Firm 1 + Firm 2 (SIC 30) new employment (emp).

The relative share of employment captured by SIC 30 (equation 3) is then expressed as:

$$\frac{\text{SIC 30 new emp.}}{\text{NV new emp.}} \quad (5)$$

The between-set entropy component for SIC 30 is obtained by:

$$-\frac{\text{SIC 30 new emp.}}{\text{NV new emp.}} \cdot \log \frac{\text{SIC 30 new emp.}}{\text{NV new emp.}} \quad (6)$$

This process is also performed for the remaining SIC groups. The summation of each group's between-set entropy becomes total between-set entropy.

Unweighted within-set entropy for SIC 30 is calculated as follows:

$$-\left(\frac{\text{Firm 1 new emp.}}{\text{SIC 30 new emp.}}\right) \cdot \log \left(\frac{\text{Firm 1 new emp.}}{\text{SIC 30 new emp.}}\right) \quad (7)$$

$$+ \left(\frac{\text{Firm 2 new emp.}}{\text{SIC 30 new emp.}}\right) \cdot \log \left(\frac{\text{Firm 2 new emp.}}{\text{SIC 30 new emp.}}\right)$$

This value is then weighted by the share of SIC 30 employment to total Nevada new employment:

$$\frac{\text{SIC 30 new emp.}}{\text{NV new emp.}} \left[- \left(\frac{\text{Firm 1 new emp.}}{\text{SIC 30 new emp.}}\right) \cdot \log \left(\frac{\text{Firm 1 new emp.}}{\text{SIC 30 new emp.}}\right)\right. \quad (8)$$

$$\left. + \left(\frac{\text{Firm 2 new emp.}}{\text{SIC 30 new emp.}}\right) \cdot \log \left(\frac{\text{Firm 2 new emp.}}{\text{SIC 30 new emp.}}\right)\right]$$

The same procedure is followed for the remaining SIC groups, and the summation of these fifteen values yields total weighted within-set entropy. Total entropy is then obtained by combining equations (6) and (8), when all fifteen SIC groups have been included in the analysis.

Relative entropies, which measure the degree to which observed entropy equals the maximum level, are also calculated. These values are obtained by dividing the observed entropy value by its maximum level, log n. For example, if each of the fifteen SIC groups had shared equally in new manufacturing firm employment during 1984, then relative between-set entropy would be 1.025469 / $\log_{10}$ 15, or 1.025469 / 1.176091 (see Table 4).

Table 1

Total Number of Jobs Created by New Firms, 1974 - 1984

Two-Digit SIC	Title	Number of Jobs
20	Food and kindred products	393
22	Textile mill products	98
23	Apparel & fabric products	295
24	Lumber & wood products	577
25	Furniture & fixtures	167
26	Paper & allied products	52
27	Printing & publishing	832
28	Chemicals	118
29	Petroleum refining	86
30	Rubber & misc. plastic	234
31	Leather & leather products	16
32	Stone, clay, glass & concrete	727
33	Primary metals	65
34	Fabric, metal products, exc. machinery	328
35	Machinery, exc. electrical	508
36	Electrical & electronic machinery	608
37	Transportation equipment	183
38	Measuring, analyzine & controlling instruments	288
39	Miscellaneous (includes gaming devices)	1,234
Total		6,809

Table 2

Manufacturing Employment in New and Existing Firms

Year	New Firm Employment	Surviving New Firm Employment	Existing Firm Employment[2]
1974	706	N/A	11,665[3]
1975	531	634	11,071
1976	501	1,560	10,984
1977	1,210	2,124	11,846
1978	906	4,209	12,719
1979	636	5,382	13,435
1980	590	6,299	12,313
1981	407	6,771	12,919
1982	486	7,038	11,267
1983	540	7,362	11,147
1984	296	8,941	11,820

1. By year of birth.
2. Includes births prior to 1974.
3. Includes surviving 1973 new firm employment — not comparable.

ANALYSIS AND RESULTS

Between 1974 and 1984, 1,065 new manufacturing firms opened in Nevada, creating 6,809 new jobs (Table 1). The majority of these new firms employed twenty or fewer workers. This is consistent with national trends, as virtually all of the new jobs created between 1980 and 1982 were generated by firms with twenty or fewer employees (Rosen, 1984).

Nearly one-fifth of the new manufacturing jobs in Nevada were created by firms in SIC 39 (Table 1). This classification includes the production of coin-operated games and amusement machines. Much of this new job growth resulted from the opening of several slot machine and gaming devices manufacturers. The second-largest source of new employment is SIC 27, printing and publishing, followed by SIC 32, stone, clay, glass, and concrete. These three industry groups combined to provide 41 percent of all new firm employment. SIC groups 35, machinery, and 36, electrical and electronic machinery, also exhibited large employment gains over the eleven-year period.

Analysis of manufacturing employment among existing and new firms indicates that new plant openings contribute a small portion (typically less than 5 percent) of the new jobs each year (Table 2). Although new firms normally expand (or contract) after opening, these additional (fewer) jobs would be reflected in the existing firm employment at a later date. Differing factors may influence plant expansions versus new openings. In 1979, for example, expansions rose by 11 percent from 1978 (surviving and existing firm employment), but new plant job creation fell by 30 percent. During the recession between 1981 and 1982, existing firm employment decreased 7 percent, but new firm employment rose 19 percent.

In order to evaluate the effect of new firm survival on job levels, the subsequent employment of surviving firms (which opened between 1974 and 1983) is also tabulated in Table 2, by year of birth. For example, 1976 surviving new firm employment includes expansions and contractions of firms opened in 1974 and 1975, and the 1984 surviving firm employment would reflect all firms which opened between 1974 and 1983.

Table 3

Total Number of Nevada Manufacturing Jobs, by SIC

SIC	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
20	1,286	1,216	1,237	1,318	1,589	1,544	1,493	1,399	1,412	1,482	1,407
22	21	23	27	44	66	82	75	85	62	74	92
23	135	274	298	214	257	149	146	200	169	180	264
24	443	442	531	785	944	933	688	696	588	904	958
25	122	169	156	178	237	317	329	367	283	314	337
26	17	19	31	36	43	45	39	65	59	166	186
27	2,123	2,134	2,299	2,418	2,652	2,969	2,981	3,124	3,036	3,105	3,318
28	834	886	910	891	854	887	820	803	802	709	686
29	10	*	*	17	72	74	51	55	66	53	53
30	191	186	246	609	456	442	879	926	898	1,018	1,217
31	*	14	17	16	15	10	*	*	*	*	*
32	1,438	1,312	1,342	1,916	1,880	2,153	1,934	1,664	1,342	1,257	1,384
33	1,508	1,452	1,112	1,132	1,270	1,486	1,626	1,772	1,443	1,043	1,085
34	486	595	826	809	1,374	1,628	1,296	1,371	1,237	1,108	1,004
35	749	841	1,007	979	1,284	1,431	1,609	1,698	1,475	1,801	2,579
36	1,577	1,464	1,747	1,976	2,441	2,757	2,562	2,541	2,650	2,719	3,021
37	56	57	72	117	141	116	161	639	702	598	907
38	381	228	158	218	526	620	675	736	712	697	752
39	987	918	1,024	1,507	1,733	1,810	1,832	1,951	1,851	1,816	1,806
Total	12,371	12,236	13,045	15,180	17,834	19,453	19,202	20,097	18,791	19,049	21,057

*Less than 10 employees.

By 1984, 8,941 jobs were provided by expansion of firms opened during the eleven-year period. This represents a 37 percent increase above the total new firm employment level by year of birth (excluding 1984 births). The percentage of jobs created by new firms and their subsequent expansion totaled 42.5 percent of all manufacturing employment in 1984. Thus, nearly one in two jobs is located in a manufacturing firm eleven years old or less. The firms which remain in business continue to grow and create additional jobs through time, while older existing firms may not expand as rapidly.

Because of the detailed nature of this data, little information is available specifically comparing job growth by age of firm. In a sample of California manufacturing firms between 1976 and 1979, however, firm expansions contributed to a 29 percent increase in employment (Teitz, 1981). This compares with a 50 percent rise in Nevada over the period. Also, between 1978 and 1982 the Mountain region of the United States (including Nevada, Idaho, Montana, Colorado, Texas, New Mexico, Arizona, and Utah) ranked first or second in the number of business births and expansions (U.S. Small Business Administration, 1983 and 1984). Thus, Nevada is keeping pace with other states in new business growth.

Changes in total Nevada manufacturing employment (including new and expanded firms) are also analyzed. Firms producing goods in SIC 35 and 36 (often referred to as high-technology industries) experienced the largest employment growth over the decade (Table 3). Employment in SIC 27, SIC 37 and SIC 39 also exhibited rapid growth over the period. Only one industry, primary metals (SIC 33), showed a significant decline in employment through 1984. Nationwide between 1979 and 1982, primary metals exhibited a 30 percent loss in employment (Rosen, 1984).

ENTROPY RESULTS

New manufacturing firm employment among and within the SIC groups is analyzed using entropy. Job dispersion by new manufacturing plants among all industrial classifications (total entropy) increased through the 1970s, but the 1980 recession slowed the equality of new firm location (Table 4). The between-set entropy measure identifies the degree of equality of new firm employment between the fifteen SIC groups. Between-set entropy has also increased since 1974. Although the effects of the recession were again felt during 1980, between-set entropy reached its highest level during 1984.

Results of relative total and between-set entropy indicate that equal dispersion of new firm jobs is more than three-fourths of the possible value during most years (Table 4). The average relative entropy values show that over the eleven-year period, relative between-set entropy is slightly higher than relative total entropy. Thus, new job dispersion among the fifteen SIC groups (between-set entropy) is greater than dispersion among all industries (relative total entropy).

Only relative unweighted within-set entropy values are reported in this paper. These relative values are reported rather than the unweighted entropy values themselves because relative values are more useful for interpretation. Also, the weighted within-set entropy values are used in calculating total entropy, but are not reported separately, because unweighted values are more informative.

Table 4

Total and Between-Set Entropy

Year	Total Entropy	Relative Total Entropy, %	Between-Set Entropy	Relative Between-Set Entropy, %
1974	1.346369	67.6	0.869507	73.9
1975	1.595171	80.3	0.960120	81.6
1976	1.517202	78.0	0.972483	82.7
1977	1.551717	73.9	0.969750	82.5
1978	1.690778	80.0	1.002820	85.3
1979	1.592913	79.3	0.997283	84.8
1980	1.298071	67.6	0.857386	72.9
1981	1.727293	88.2	0.981270	83.4
1982	1.442246	76.5	0.891383	75.8
1983	1.549547	77.3	0.981660	83.5
1984	1.673381	88.7	1.025469	87.2
Average	1.544063	77.9	0.955967	81.2

Relative unweighted within-set entropies by SIC have varied over the period examined. As seen in Table 5, for example, relative entropy values for SIC 35 and 36 have decreased between 1974 and 1984. Although these two sectors have created many new jobs over the eleven-year period, the relative entropies indicate that the composition of these two sectors is changing. A smaller number of firms dominated new job creation in 1984 than in 1974, when employment creation was shared more equally by new firms. For example, suppose that SIC 30 gained twenty new jobs in one year. The relative unweighted within-set entropy would be greater if these twenty jobs resulted from four new firms of five employees each, rather than from one firm of sixteen employees and another firm of four employees.

Other industrial groups which have experienced declining relative unweighted within-set entropy include SIC 20 and 25. Firms in the remaining SIC groups now share more equally in new job creation than in 1974. Two industry groups, SIC 30 and the combined group of SIC 22, 26, 29, and 31, reached 100 percent of the possible relative entropy in 1984. All new firms in these groups shared equally in new job creation.

All of the relative unweighted entropy values reported are greater than 80 percent in 1984, compared to only eight industries above 80 percent in 1974. Thus, Nevada's recent manufacturing growth within industry sectors has resulted from a more equal contribution of employment from new firms than in the past.

Although the calculated entropy values given in Tables 4 and 5 have varied over the period, a statistical test was performed to determine whether they have changed over time. Each of the entropy series was regressed against time.

Table 5

Relative (Unweighted) Within-Set Entropy, by SIC

SIC	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
						(Percentages)					
20	134.3	82.5	81.1	48.7	67.7	0.0	76.1	81.1	0.0	79.0	87.0
23	72.2	34.7	37.1	94.3	57.7	50.3	0.0	98.5	0.0	80.4	92.3
24	83.5	82.9	23.3	89.8	75.2	73.6	74.2	67.2	78.0	57.3	94.3
25	92.1	0.0	100.0	45.5	63.1	74.6	0.0	91.8	0.0	0.0	0.0
27	89.9	76.8	66.6	89.4	89.5	91.5	64.5	73.4	84.9	72.0	90.8
28	82.8	0.0	0.0	76.4	79.0	96.0	92.3	0.0	94.6	88.7	91.9
30	95.9	0.0	94.6	76.1	100.0	87.2	97.1	82.2	72.5	72.3	100.0
32	73.1	76.5	91.4	83.3	93.3	21.6	25.0	92.3	91.8	84.9	83.3
34	81.9	84.3	81.6	84.3	77.6	83.8	91.0	75.3	64.9	98.2	95.3
35	94.1	93.8	95.1	49.1	85.4	87.7	92.0	84.8	55.2	66.9	78.7
36	94.7	81.1	85.3	34.6	74.8	62.0	84.8	83.1	52.0	33.9	84.5
38	29.8	98.5	62.2	93.6	70.0	0.0	0.0	0.0	3.7	67.6	84.5
39	32.3	91.8	84.4	72.6	78.7	77.5	101.0	85.6	71.5	84.2	91.6
22,26, 29,31	72.2	72.2	43.9	42.8	77.0	91.0	36.2	0.0	0.0	74.9	100.0
33,37	21.3	89.3	30.8	98.1	82.3	92.5	90.9	62.2	0.0	74.5	91.9

Entropy measures of new Nevada manufacturing firm employment have not changed over time (at the 0.05 level of significance). This indicates that no one type of manufacturing firm has dominated new job creation in Nevada between 1974 and 1984. Total entropy, reflecting dispersion of new firm employment among all industry groups, exhibits a positive but insignificant (0.05 level) time trend. Between-set entropy displays the same positive trend over time, but this trend is not significiant either.

None of the fifteen unweighted within-set entropy values exhibited significant (0.05 level) changes in job dispersion over time. Seven of the SIC groups experienced a positive time trend, but the remaining eight groups exhibited a negative time coefficient. Thus, more than one-half of the SIC groups now share new employment creation less equally.

These results differ greatly from other entropy studies. In Oklahoma, for example, several community population groups experienced significant increases in job dispersion over time (Blalock and Doekson, 1974). The Oklahoma Industrial Development and Park Commission created eleven sub-state planning districts in 1971. This coordinated effort in planning may have led to the significant new firm dispersion in that state. Nevada has only recently begun a coordinated effort to attract new firms. These efforts may result in increased new firm location and employment for Nevada in the future.

SUMMARY AND CONCLUSIONS

Because of the recent drive to diversify Nevada's economy beyond gaming, this paper has analyzed the number and type of new manufacturing firms which have located in the state between 1974 and 1984. Results of this analysis indicate that nearly one-half of the new manufacturing firm jobs were provided by three SIC groups, SIC 27, 32, and 39. Of this, almost one-fifth were provided by SIC 39 firms, which includes producers of gaming products and devices. Thus, even the manufacturing industry is related to the state's gaming industry, as producers locate closer to their sources of demand.

Nevada also appears to have a comparative advantage in attracting firms in SIC 27, printing and publishing. This industry continues to grow, as several printing companies have recently announced plans to locate in the Reno area.

Although entropy values have increased over the period for many industries, regression results indicate that these increases are not statistically significant (0.05 level) over time. Thus, new manufacturing firm employment is not dispersed more equally throughout industrial groups in Nevada in 1984 than in 1974. This is evidenced by the fact that three industries provided nearly one-half of new manufacturing employment over the period examined.

As this study has shown, many new manufacturers have opened in the state. The employment growth witnessed during the 1970s and early 1980s indicates that the state does have the potential for economic growth and diversification. With the recent creation of several economic development authorities, the state is targeting the types of firms compatible with Nevada's resources and workforce. As a result of these efforts, perhaps significant trends in new firm job dispersion will be observed in the future.

References:

Blalock, M. Gale, and Gerald A. Doeksen. "An Examination of the Trend in Industrial Dispersion in Oklahoma from 1963 through 1974." *Southern Journal of Agricultural Economics;* (July 1977): 89-94.

Garrison, Charles B. "Industrial Growth in the Tennessee Valley Region, 1959 to 1968." *American Journal of Agricultural Economics; (February 1974): 50-60.*

Nevada Employment Security Department records, Carson City, NV.

Rosen, Richard J. "Regional Variations in Employment and Unemployment during 1970-1982." Monthly Labor Review; (February 1984): 38-45.

Smith, Gary W., and Bruce A. Weber. *Growth, Diversification, and Cyclical Instability in the Oregon Economy, 1960-1979.;* Agricultural Experiment Station Bulletin 712. Corvallis: Oregon State University, May 1984.

Teitz, Michael, Amy Glasmeier, and Douglas Svensson. *Small Business and Employment Growth in California.* Institute of Urban and Regional Development Working Paper No. 348. Berkeley: University of California, March 1981.

U.S. Small Business Administration. *The State of Small Business: A Report of the President Transmitted to the Congress.* Washington, D.C.: Government Printing Office, 1983.

U.S. Small Business Administration. *The State of Small Business: A Report of the President Transmitted to the Congress.* Washington, D.C.: Government Printing Office, 1984.

Efficiency of State Retirement Systems in Four Western States

*by Ralph A. Pope**

One hundred and ninety state-administered retirement systems manage the retirement program of over eleven million active members and beneficiaries. These systems account for over 87 percent of all state and local government employees covered by public retirement systems.[1] An analysis of the cost behavior of these systems has only recently been addressed. The purpose of this paper is to explore the cost relationships among state retirement systems using econometric modeling. Furthermore, the cost behavior of state retirement systems in Nevada and other selected Western states will be analyzed and compared to the model.

RESEARCH METHOD

In order to compare the costs of state retirement systems, a model must be devised that associates costs with cost influencing factors. The most important cost influencing factor is designated as the primary output variable. The usual methodology employed in the development of statistical cost functions is multiple regression analysis with variables transformed into logarithms.[2] A distinct advantage of a logarithmic model is that the coefficient of the primary output variable is interpreted as an elasticity. This elasticity is used to determine whether the industry or financial intermediary in question is subject to economies or diseconomies of scale. If the coefficient is greater than one, the industry or intermediary is subject to diseconomies of scale. A 1 percent increase in output is accompanied by more than a 1 percent increase in cost. If the coefficient of the primary output variable is less than one, a 1 percent increase in output is subject to less than a 1 percent increase in costs.

VARIABLES USED IN THE MODEL

The regression equation consists of a dependent variable and three independent variables. The operating cost for each system (E) is the dependent variable. Operation costs are those costs which are necessary to administer the retirement system and manage the system's portfolio of assets. Operating costs consist of the sum of administrative and investment costs. Generally, these costs include the salaries and fringe benefits of the system's personnel, the costs of professional and contractual services (such as the cost of investment management and advisement), occupancy costs, the costs of data processing, supplies, and miscellaneous costs. Operating costs will be regressed on the independent variables. It is the dependent variable that the model is attempting to explain by the behavior of the independent variables.

The independent variables consist of a primary output variable (Q) and two other variables reflecting input price differences. Studies analyzing cost relationships often employ a primary output variable.[3] The output variable in this study is the sum of active members and beneficiaries. This measure has been used as the primary output variable when analyzing statistical cost functions of private pension plans. The rationale for using participants is that most of a retirement system's operations consist of record keeping, counseling, and asset management. Operating costs are related primarily to the number of active and retired accounts handled and members served.

The second and third independent variables are qualitative or dummy variables reflecting differences in the input costs of retirement systems. Including variables that reflect differences in input costs is necessary in a statistical cost model because some systems are in high cost areas while others are in low cost areas. The first of these variables is based on the nonmanufacturing clerical interarea pay comparison index developed by the Department of Labor. This best represents the work force of a retirement system. Since wages and salaries account for well over half the expenses of public employee retirement systems, personnel costs are used as a proxy for all costs in general. The assumption is that if wages and salaries are high, other costs will generally be high. If the index for the SMSA where the system is located (or the nearest SMSA) was over 100, a one was assigned to the dummy variable. If the index was 100 or less, a zero was assigned to the dummy variable.

The second input price variable distinguishes between systems in the twelve-state Southeastern region as defined by the Commerce Department and the rest of the country. This region of the country has consistently had the lowest per capita income of any region and has historically lagged behind other areas of the country according to most economic measures. The Southeastern region also ranks last in terms of per capita state expenditures, revenues, and taxes. Because of these features that characterize the administration of state governments in the region, another variable further differentiating factor costs is used to isolate systems in the region. When using this dummy variable, a zero was assigned to all systems in the Southeastern region, a one was assigned to all other systems.

*Ralph A. Pope is Assistant Professor of Finance in the College of Business, Illinois State University, Normal, Illinois.

SOURCE OF DATA

The primary source of data was the 1984 *Survey of State Retirement Systems* compiled by the National Association of State Retirement Administrators.[4] Of the 54 systems in the survey, 26 had the necessary information to be included in this study. Because there is no standard fiscal year used by public employee pension plans, the systems used in this sample were those with fiscal years ending from December 1983 to November 1984.

The most recent Census of Governments shows that the average size of a state-administered system which includes active members and beneficiaries is 65,280 total members.[5] The smallest system in this study was North Dakota's, with active members and beneficiaries equaling 15,244 total members. The largest was in New York with 746,279 total members. A breakdown of the sample data by the number of active and retired members is presented in Table 1.

Table 1

Size Distribution of Sample Retirement Systems

Total Members	15,000 - 49,999	50,000 - 99,999	100,000 - 249,999	250,000 and over
Number of Systems	7	5	9	5

Inferences about public employee retirement systems must be made carefully because the systems in this sample were selected on the basis of data availability. However, the results of this paper correspond quite well to other statistical cost research on public employee pension plans.

RESULTS

The model is described below:

E = Operating costs.
Q = Total members, including both active members and beneficiaries
NS = 1 if system is in a non-Southern state
= 0 if system is in a Southern state
WAR = 1 if system is in an area where the wage index is greater than 100
= 0 if system is in an area where the wage index is 100 or less.

The regression results are shown in Table 2. The equation is in natural logarithms.

The R^2 in Table 2 shows that 86 percent of the variability in the dependent variable is explained by the independent variable. Also, t statistics (shown in parenthesis) over two usually indicate a highly significant relationship between the dependent variable and the independent variable in question. Two of the three independent variables in this model have t statistics over two.[6]

In order to compare the operating costs of state retirement systems it is necessary to generate cost data. Calculating operating costs for a retirement system of 50,000 members in a high input price area of a non-Southern state is shown below:

Log E = 4.75 + .849Q + .622NS + .181WAR
14.739 = 4.75 + .849(10.8198) + .622(1) + .181(1)
Operating Costs = $2,518,087
Average Cost = $50.36

Average cost data at selected membership levels for high and low input price areas for Southern and non-Southern states are shown in Table 3. An alternative model with two independent variables is included in the Appendix.

Table 2

Regression Results

Variables	
Q	.849 (11.32)[a]
NS	.622 (3.66)[a]
WAR[b]	.181 (1.13)[c]
CON	4.75
R^2	.86
F	44.86
	n = 26

a Significant at 1-percent level — two-tailed test.
c Significant at 15-percent level — one-tailed test.
b Although the t statistic for the variable WAR is not significant at the .05 level of significance, the variable is retained in the model for two reasons. First, previous research by this author — using 1979 and 1980 data and a larger sample — found the interarea pay comparison variable to be significant at the .02 level of significance. Second, Cassidy (1981, p. 162) states that if the adjusted R^2 increases and the other coefficients do not change much, then the variable may be included. This is the case in this paper.

Table 3

Average Operating Cost at Selected Levels of Output

Total Members	50,000	100,000	150,000	250,000
Southern (Low Cost)	$22.56	$20.32	$19.11	$17.69
Southern (High Cost)	27.04	24.35	22.90	21.20
Non-Southern (Low Cost)	42.02	37.85	35.60	32.96
Non-Southern (High Cost)	50.36	45.36	42.66	39.50

APPLICATION OF THE MODEL TO FOUR WESTERN STATES

Knowledge of cost behavior is important in order to plan and to control costs. By comparing the costs of state administered retirement systems using econometric modeling, government planners can more effectively evaluate the cost effectiveness of a system, investigate deviations from standard norms, and plan for the future.

Two points can be made with respect to state administered retirement systems in Western states and the cost model that has been developed. First, the model is useful in long run

planning. A coefficient of .85 of the primary output variable suggests that a 1 percent increase in output (membership) is accompanied by a .85 percent increase in operating expenses over the range of data examined.[1] Larger systems experience lower costs per member than systems with fewer participants. According to the data generated, a non-Southern system in a high cost area with 250,000 participants has an average cost of $39.50, while a system with 50,000 members has an average cost of $50.36. Therefore, systems of smaller states, such as Nevada and Idaho, each with less than 60,000 members, should experience higher costs than the retirement systems in Wisconsin (242,000 members) or New York (746,000 members).

Factors such as greater specialization of labor, employing more specialized capital, and the existence of purchasing economies appear to be at work. As has been done in several Western states, consolidating public employee retirement systems within a state has generally been successful in reducing operating costs per member. However, in smaller Western states, there are practical limits with respect to the maximum extent of consolidation.

Second, the model can be used as a first step in determining the economic efficiency of a specific system at a particular level of output (membership). A retirement system may operate at a more or less efficient level of operation than another system of comparable size, although each provides approximately the same services to members. Table 4 shows the average operating cost of the retirement systems of Nevada, Idaho, Arizona, and Oregon and compares them to the average costs generated by the model.

As can be seen in Table 4, Nevada's state retirement system compares favorably with other systems of the same size and in the same cost circumstances. An average cost of $38.55 per member is considerably less than the $50.22 predicted by the model for a non-Southern system in a high cost area. The average costs of the retirement systems in Idaho and Arizona are slightly higher than the model predicts. Idaho's system is operated at approximately 10 percent over the forecasted amount, while Arizona's system is 7 percent over that predicted by the model. Oregon's state retirement system experienced average costs of $51.82, while the equation forecasted a cost of $42.41 per member. Oregon's costs are approximately 22 percent higher than those of a non-Southern system in a high cost area with the same membership.

Table 4

Comparative Efficiencies of the State Retirement Systems of Four Western States

	Nevada[a]	Idaho[b]	Arizona[b]	Oregon[a]
Average Cost of System	$38.55	$45.73	$39.04	$51.82
Number of Members	50,939	55,117	129,264	155,935
Average Cost of Model	$50.22	$41.41	$36.41	$42.41

a High-cost area as determined by interarea pay comparison index.
b Low-cost area as determined by interarea pay comparison index.

The information derived from the equation is useful for establishing a benchmark when analyzing the operations of state retirement systems. However, it is only a benchmark. The equation cannot determine the reasons for the Nevada Public Employees Retirement System being administered at a lower per member cost than expected, nor Oregon's Public Employees Retirement System being administered at a higher cost than forecasted. Although 86 percent of cost variation is explained by the three independent variables used, complete accuracy in forecasting costs and in determining whether a system is efficient, cannot be achieved by this model. For example, to measure cost differences among regions, binary variables distinguishing between Southern and non-Southern states and high and low wage areas are used. In reality, there is a wide range of input cost differences.

Although the model establishes a benchmark that can be used in investigating operating costs, a second step is needed. The second step is a more detailed analysis in order to better determine a system's deviation from the norm.

CONCLUSION

Econometric analysis can be a useful tool in planning for future expenditures and in controlling the costs of government programs. In this model, operating costs have been estimated using three variables: total participants, a wage differential variable, and a regional variable. Using this equation, it has been shown that the Nevada State Retirement System has below average costs, while the state retirement system of Oregon has above average costs. Although the equation presented is useful in trying to determine whether a system is efficient, it should be considered only a first step.

APPENDIX

A simpler model can be used by excluding the interarea pay variable and retaining the primary output variable and the variable that distinguishes between Southern and non-Southern states.

$$\text{Log } E = 4.91 + \underset{(11.14)}{.838Q} + \underset{(4.03)}{.670NS}$$

(t statistics are in parenthesis)

$R^2 = .84 \qquad F = 65.84$

This model will generate the following average cost data for the retirement systems of the four states in question.

	Nevada	Idaho	Arizona	Oregon
Actual Average Cost	$38.55	$45.73	$39.04	$51.82
Number of Members	50,939	55,117	129,264	155,935
Estimated Average Cost	$45.80	$45.21	$39.38	$38.20

Footnotes:

1. Census of Governments. *Employee Retirement Systems of State and Local Government.* Washington, D.C.: Bureau of the Census, 1982.
2. A trans-log model has occasionally been used in the literature. However, this model often requires several thousand observations to reduce multicollinearity and to produce statistically significant t statistics.

3. See, for example, Benston (1965), Doherty (1981), and Caswell (1976).
4. National Association of State Retirement Administrators. *Survey of State Retirement Systems*, vols. I and II, Montgomery, Alabama, 1984.
5. *Employee Retirement Systems of State and Local Government*. By contrast, the average size of locally administered systems is 887 total members.
6. For the technical reader, the residuals do not appear to be heteroskedastic. Ranking the data by size, dividing them in half, and calculating the MSE for each, the equality of variance is determined by an F test. At the .05 level, with 9 degrees of freedom, the action limits are 3.18 and .314. The ratio of MSEs is 1.42. Since F* falls between the two limits, we conclude equal variance.
7. The results correspond well to a previous study (Cassidy, 1981). In that study, using a similar model over approximately the same range of data, the coefficient of the primary output variable was approximately .82.

Bibliography

Benston, George J. "Economies of Scale and Marginal Costs in Banking Operations." *The National Banking Review 2* (June 1965): 507-49.

Cassidy, Henry J. *Using Econometrics*. Reston, Va.: Reston Publishing Company, 1981.

Caswell, Jerry W. "Economic Efficiency in Pension Plan Administration: A Study of the Construction Industry." *Journal of Risk and Insurance* 43 (June 1976): 257-73.

Census of Governments. *Employee Retirement Systems of State and Local Government*. Washington, D.C.: Bureau of the Census, 1982.

Doherty, Neil A. "The Measurement of Output and Economies of Scale in Property-Liability Insurance." *Journal of Risk and Insurance* 48 (September 1981): 390-402.

National Association of State Retirement Administrators. *Survey of State Retirement Systems*, Vols. I and II, Montgomery, Alabama, 1984.

The Recent Development of the U.S.-China Trade

*by Kuo C. Tseng**

I. BACKGROUND

In the 1950s the trade partners of the People's Republic of China (PRC) were limited to the Soviet Bloc. During that decade the PRC's international trade tripled as a result of rapid growth in the trade with that bloc. Unfortunately, the trade slumped in the 1960s due to the Sino-Soviet rift, three disastrous harvests after the Great Leap Forward, and the Cultural Revolution. Things turned around in the 1970s when the PRC resumed speedy foreign trade with the non-communist countries, particularly with Japan, the United States, West Germany, Hong Kong, and Singapore.

Since 1949 the international trade relation between the U.S. and the PRC has depended heavily on the complex relationship of diplomacy, politics, military strategy, and economic interest among the U.S., the PRC, and Taiwan. The U.S. unilaterally imposed a trade embargo on the PRC after it took over Mainland China in 1949. The U.S.-PRC trade came to a nearly complete halt for a little over two decades until the trade embargo was officially lifted on June 10, 1971, before former President Nixon made his historical visit to China and the Shanghai Communique in 1972. Once the trade relation resumed, U.S.-PRC trade increased substantially from U.S. $4.9 million in 1971 to U.S. $111 million in 1972. The U.S.-China trade has grown continuously since then.

To promote the U.S.-PRC trade, the United States established the National Council for U.S.-China Trade (NCUSCT), and the PRC set up the China Council for the Promotion of International Trade (CCPIT) in 1973. On January 1, 1979, the full diplomatic relationship between the U.S. and the PRC was restored. When the U.S.-China Trade Agreement Act was passed on January 24, 1980, the PRC was granted Most-Favored-Nation status and Export-Import Bank credits. Months later, the PRC assumed the China seat, which was previously occupied by Nationalist China in Taiwan, in the International Monetary Fund and the World Bank.

Since China is basically a centrally planned economy, its foreign trade policy is also dictated by central planning. To promote exports to pay for necessary imports, new and decentralized government units were established in the early 1980s. Imports are controlled by the government to ensure the imports of essential consumer goods and capital goods for modernization. The government also controls foreign exchange by fixing foreign-exchange rates and approving the foreign exchange to be obtained. To encourage specific exports, the government pays more Renminbi per U.S. dollar earned than the standard official exchange rate.[1]

The principal purpose of this study is to examine the recent change in the U.S.-PRC relationship and its impact on the development of the U.S.-China trade. One of the main difficulties for a study of the U.S.-China trade is the lack of reliable and accurate data.[2] Section II describes the recent development in U.S.-China trade relationships. Section III discusses the recent development of the U.S.-China trade, while Section IV focuses on the comparative advantages and disadvantages of China's economy. China's economic policy and the prospect of future U.S.-PRC trade is briefly presented in the final section.

II. RECENT DEVELOPMENT IN THE U.S.-CHINA TRADE RELATION

In addition to the major diplomatic and trade breakthroughs between the U.S. and the PRC as pointed out previously, several other important events[3] have occurred in recent years. In 1974 the NCUSCT sponsored the first U.S. tours by members of China's CCPIT. In 1975 the first major trade delegations from the PRC visited the U.S. to stimulate American interest in trade with China and to discuss the issue of legislative barriers to doing business with China. In the same year, a delegation from the China National Textiles Import and Export Corporation came to the U.S. to investigate the potential U.S. market. In turn, the textiles subcommittee of the Importers' Committee made a presentation in the PRC to introduce the U.S. textiles market to China. In July 1980 the visa system for PRC textile exports to the U.S. was established. Under this system each commercial shipment of cotton, wool, and man-made fiber textiles and apparel products must be accompanied by an export visa.[4] Agreements relating to the visa system for PRC exports of textiles and products became effective on January 1, 1983. These agreements limited to some extent the actual exports of textile products from the PRC to the U.S. in the past few years.

In 1976 the NCUSCT opened a Hong Kong office to help facilitate travel and business arrangements for the U.S. firms going to China. In the same year a China Agricultural Conference was held in St. Louis to promote further exports of U.S. grain to the PRC. A Petroleum Conference was held that year to promote sales of petroleum equipment to

*Kuo C. Tseng teaches at California State University, Fresno and appreciates suggestions by the editor.

China. In 1977 delegations of the American Food Processing and Packaging, of the Mining Industry Committee, of the Importers Steering Committee, and of the NCUSCT's Petroleum Equipment Committee visited China to discuss possible technical exchanges, U.S. importing standards and regulations, and sales of petroleum, agriculture, and mining equipment. China responded in 1978 by announcing that it would begin purchasing about 60 percent of its grain imports from the U.S. Later in the same year, the U.S. government gave permission for the first time to sell an advanced telecommunication system to China.

After granting the Most-Favored-Nation status to China in 1980, the defense secretary announced that the U.S. would now approve sales of selected categories of non-lethal equipment on the munition control list. Later, former President Carter and Chinese Vice-Premier Bo Yibo signed agreements relating to textiles, civil aviation, shipping, and consular convention. In 1981 the first U.S. Export-Import Bank loan to assist U.S. exports to China was signed. The State Department removed the PRC from the list of prohibited destinations for items on the munition control list. In 1982 the U.S. and the PRC signed a joint communique on arms sales to Taiwan. Many more trade and investment promotions and arrangements have been undertaken between the two countries since the early breakthroughs in diplomatic and trade relations, but the early developments are the most critical.

III. RECENT DEVELOPMENT OF THE U.S.-CHINA TRADE

Total trade between the U.S. and the PRC increased more than 22 times from 1971 to 1972 after the U.S. lifted its trade embargo on the PRC in 1971. The rapid trade growth between the two countries continues. The total trade increased from U.S. $111 million in 1972 to U.S. $6,078 million in 1984, an increase of almost 54 times. This phenomenal growth in trade between the two countries can be attributed to new developments in diplomatic and trade relations and efforts to promote trade as pointed out in the previous section.

China appears to be learning from the successful economic development stories in countries such as Japan, Taiwan, Hong Kong, South Korea, and Singapore. One common characteristic among these countries is that foreign trade plays a crucial role in their economic development. China desperately needs foreign capital and technology to industrialize and modernize. To achieve this goal, it is necessary to finance the required imports. To promote exports, most commodities can be exported by trading companies with the approval by provincial foreign trade bureaus rather than directly by the Ministry of Foreign Trade. This decentralization policy has facilitated exports, but bureaucracy remains as a serious problem. In addition, trading companies have been formed in cooperation with manufacturing and industrial enterprises to produce export goods. To utilize their cheap labor, foreign capital, and essential materials, several coastal provinces have been designated as special export-processing zones.

It has long been argued that international trade is instrumental in economic development. The following quotation from Haberler[5] is still a valid argument applicable to China:

> First, trade provides material means (capital goods, machinery, raw and semifinished materials) indispensable for economic development. Secondly, even more important, trade is the means and vehicle for the dissemination of technological knowledge, the transmission of ideas, for the importation of know-how, skills, managerial talents and entrepreneurship. Thirdly, trade is also the vehicle for the international movement of capital, especially from the developed to the underdeveloped countries. Fourthly, free international trade is the best antimonopoly policy and the best guarantee for the maintenance for a healthy degree of free competition.

There are good reasons for the PRC to be interested in enhancing its trade relation with the U.S. The U.S. has been the leader in technology for quite some time, and it is most logical for China to import the most modern machinery and equipment from the U.S. For many years Japan has been the largest trade partner because of geographic proximity, longer trading history, earlier restoration of diplomatic relations, superior technology and international marketing, and similar cultural background. It is to the advantage of the PRC to diversify its trading partners to avoid unduly heavy reliance on trade with Japan. It is worth pointing out that since most Western European industrialized countries, Japan, and Canada had restored their normal diplomatic and trade relations with China earlier than the U.S., the PRC in the earlier years had to import capital goods and other modern technology from those countries and agricultural products from Australia and Canada. Recent rapid growth of trade between the U.S. and China was partly attributable to the PRC's effort to diversify and redirect its foreign trade relations.

It is to be noted that the PRC's trade policy has always been closely tied to diplomatic or foreign relations. In the 1950s and 1960s, Japan tried very hard to separate trade relations from political and diplomatic relations with China without any success. Furthermore, since the deterioration of the Sino-Soviet relation in the early 1960s, there are strategic reasons for China to improve its foreign relations, including its trade relations with the U.S. From the economic, strategic, and political viewpoints, it is to the advantage of China to seek closer ties with the U.S. The lift of trade embargo in 1971, the Shanghai Communique in 1972, and the establishment of formal diplomatic relations in 1979 are the major steps contributing to the rapid growth of trade between the U.S. and China.

The phenomenal growth of the U.S.-China trade can easily be seen from Table 1. The two-way trades between the U.S. and China were $4.9 million in 1971, $111 million in 1972, $5.5 billion in 1981, and $6.1 billion in 1984. The PRC's exports to the U.S. have been steadily increasing since 1971, but U.S. exports to the PRC have fluctuated due to political

Table 1

Major Trade Partners of China

(Unit: U.S. $ Million)

	1972	1973	1974	1977	1978	1979	1980	1981	1982	1983	1984
(1) Export from China (f.o.b.)											
Total	3,085	4,960	6,515	8,177	10,167	13,651	18,919	21,545	22,900	23,520	27,439
Japan	468	918	1,241	1,486	1,948	2,793	4,139	5,032	5,083	4,846	5,660
W. Germany	92	130	168	250	319	464	703	669	610	668	740
U.S.	32	64	115	203	324	597	1,059	1,875	2,274	2,257	3,074
Hong Kong	509	784	876	1,735	2,249	3,021	4,401	5,264	5,431	5,847	7,131
(2) Import to China (f.o.b.)											
Total	2,835	5,130	7,490	6,598	10,326	14,369	19,268	18,029	16,686	18,341	25,101
Japan	640	1,089	2,086	1,955	3,074	3,674	5,109	5,076	3,500	4,918	7,199
W. Germany	190	356	484	501	995	1,493	1,145	1,017	853	1,075	1,038
U.S.	79	812	949	171	865	1,724	3,755	3,603	2,912	2,173	3,004
Hong Kong	4	9	19	44	63	382	1,249	1,957	1,954	2,495	5,031
(3) Trade balance											
Overall	250	-170	-975	1,579	-159	-718	-349	3,516	6,214	5,179	2,338
Japan	-172	-171	-845	-469	-1,126	-881	-970	-44	1,583	-72	-1,539
W. Germany	-98	-226	-316	-251	-676	-1,029	-442	-348	-243	-407	-298
U.S.	-47	-748	-834	32	-541	-1,127	-2,696	-1,728	-638	79	70
Hong Kong	505	775	857	1,691	2,186	2,639	3,152	3,307	3,477	3,352	2,100

Sources: (1) For the period 1972—74, from Gene T. Hsiao, *The Foreign Trade of China: Policy, Law, and Practice*, University of California Press, 1977. (2) For the period 1977—84, from Central Intelligence Agency, *China International Trade*, various quarters and years.

maneuvering[6] before 1979, changes in economic development programs, and shortage of foreign exchange and credits. In 1972 the U.S. was not even among the top ten trade partners of China; it has become the third largest trade partner since 1973, behind only Japan and Hong Kong. With the exception of 1977, 1983, and 1984, the U.S. enjoyed a favorable balance of trade with China during that period of rapid growth.

In the last ten years, China exported the most to Hong Kong followed by Japan, the U.S., West Germany, Singapore, France, Italy, and Britain. During the same period of time, China imported more from Japan than any other country followed by the U.S., Hong Kong, West Germany, Canada, Australia, Britain, France, and Italy. Since 1983 China has imported more from Hong Kong, partly because of its increasing imports from Taiwan through Hong Kong. Actually, Taiwan's exports to China also go through South Korea and Japan.

Broadly speaking, China has imported foodstuff for consumption by its large population and capital goods and technology for its industrialization and modernization. Food has been imported mainly from the U.S., Australia, and Canada, while capital goods have come from Japan, the U.S., West Germany, and other Western European countries. Imports of nonfood consumption goods such as electronic and electric products from Taiwan have been increasing rapidly since 1983.

Exports from China consist primarily of textile products, other light industry products, food, chemicals, crude oils, metals, and minerals. Meat, fruit, vegetables, and rice have been exported to Hong Kong and Southeast Asian countries. Crude oil has been exported increasingly to Japan. Exports of animal byproducts such as hides, leather, furs, feathers, and carpets are also important. Exports of art goods include ivory, jade, jewelry, wood carvings, paintings, and porcelain.[7] Exports other than textiles and products from China are rather diversified.

Autarky, self-reliance, and minimum foreign debt have always been the fundamental economic policy of China. For almost three decades since 1949, foreign trade played only a minor role in the Chinese economy and accounted for no more than 4 to 5 percent of its gross national product. In the past ten years, its foreign trade sector has been growing more rapidly than other sectors of its economy and is expected to continue to grow at a faster pace in the future.

The fundamental economic policy of China was to develop heavy industries through continuous development of agriculture and light industries. The large population must be fed and utilized. That policy was updated and modified in 1977 by advocating the so-called Four Moder-

nization Program. This program stresses the faster development of science and technology, industry, agriculture, and military defense. To accomplish that program, China has been increasing its imports of capital goods and modern technology from the advanced industrialized countries, particularly Japan and the U.S. To finance the imports of necessary capital goods and essential materials and parts, the PRC designated some coastal areas as special economic zones and adopted the compensation trade[8] and processing agreements.[9]

Based on the Heckschler-Ohlin theory of comparative advantage, many products can be traded between the U.S. and the PRC. The comparative advantages of the U.S. are its modern technology, capital goods, know-how such as efficient management and superior marketing, and diversified agricultural production. The most significant comparative advantages of China are its abundant cheap labor and some natural resources. China can benefit by importing capital goods, technology, and agricultural products from the U.S. to utilize Chinese labor and accelerate its economic development. However, the PRC's capacity to import from the U.S is seriously limited by its ability to export and to earn foreign exchange.

In 1978, Chinese imports of agricultural products such as corn, wheat, and soybeans accounted for slightly over 50 percent of total imports from the U.S. From 1980 to 1984, as shown in Table 2, imports of food and live animals and crude materials declined, while imports of chemicals and machinery and equipment increased rapidly. Imports of fertilizers, resins and plastics, construction equipment, automatic data processing machines, and trucks increased steadily. Other major imports from the U.S. were cotton, pesticides, metal and metal products, communication equipment, survey and navigation equipment, and measuring and testing equipment.

As for Chinese exports to the U.S., the single most important item was textile products. In 1978 textile export accounted for about 37 percent of the PRC's total exports to the U.S. Exports of woven cotton fabrics, fabricated textile products, men's and women's outer garments, woven under garments, knitted under and outer garments, and fur clothing increased rapidly. In 1984, these textile related products still accounted for over 36 percent of total exports to the U.S. Other principal exports[10] to the U.S. were agricultural products such as shellfish, nuts, sugar and syrup, tea, feathers and down, bamboo products, inorganic chemicals, essential oils, ores, tin, machinery and transport equipment, footwear, headwear, gloves, fireworks, and antiques. (See Table 3.)

IV. THE COMPARATIVE ADVANTAGES AND DISADVANTAGES OF CHINA'S ECONOMY

In 1949 when the Communists took over Mainland China, its population was estimated at around 542 million. The natural rate of increase in population in the 1950s and the 1960s was over 2 percent per year. Even though the population growth rate decelerated significantly in the 1970s and thereafter, its population reached the one billion mark in 1981. It was estimated that about 44 percent of the population was employed. Although almost all school-age children were attending primary schools, less than 0.5 percent of them were expected to finish college. Improvement in education is a key to China's future economic development.

Table 2
China's Major Imports from the United States
(U.S. $ Million)

	1980	1981	1982	1983	1984
Total	3,754	3,603	2,912	2,173	3,004
Food and Live Animals	1,265	1,332	1,238	541	579
Wheat	1,039	1,269	1,047	378	575
Crude Materials	1,186	1,103	589	300	459
Logs and other Rough Wood	41	89	212	228	272
Synthetic Textile Fiber	194	317	91	25	80
Chemicals	386	409	497	355	645
Fertilizers	153	131	147	168	267
Resins and Plastics	124	170	237	92	234
Semi-Manufactured Goods	425	449	277	219	189
Machinery and Equipment	358	249	256	674	1,014
Construction Equipment	43	32	48	51	136
ADP Machines	23	14	25	37	78
Trucks	9	4	5	13	50
Aircrafts	155	8	19	235	114
Miscellaneous Manufactured Articles	57	33	42	78	98

Source: Central Intelligence Agency, *China: International Trade*, various quarters and years.

Table 3
China's Major Exports to the United States
(U.S. $ Million)

	1980	1981	1982	1983	1984
Total	1,053	1,892	2,284	2,244	2,940
Food and Live Animals	58	96	120	112	141
Vegetables, Prepared	21	35	42	39	55
Crude Materials	127	333	120	97	112
Mineral Fuels and Products	135	294	598	430	609
Crude Oil	19	—	198	79	235
Petroleum Products	82	293	400	351	374
Chemicals	107	126	136	131	153
Semi-Manufactured Goods	235	374	386	390	555
Cotton Fabrics, Woven	45	89	74	76	120
Fabricated Textile Products	28	53	76	72	104
Floor Coverings	49	67	54	62	91
Machinery and Equipment	6	40	48	41	64
Misc. Manufactured Articles	380	621	863	1,027	1,281
Travel Goods and Handbags	3	15	30	41	92
Men's Outer Garments	37	71	122	167	157
Women's Outer Garments	81	169	258	308	329
Under Garments, Woven	30	55	76	77	84
Knitted Outer Garments	59	51	78	85	100
Knitted Under Garments	14	32	49	79	102
Fur Clothing	13	22	28	38	67

Source: Central Intelligence Agency, *China: International Trade*, various quarters and years.

With abundant labor force and centrally planned economy, the wage rate in China has been held artificially low. The annual wage including bonuses of staff and workers in state-owned units in 1952 was 446 yuan. It increased steadily to 637 yuan in 1957 but declined in 1958 and 1959. Since then it fluctuated within a very narrow range. For example, in 1959 it was 524 yuan, and it was 609 yuan, 602 yuan, and 644 yuan in 1970, 1977, and 1978, respectively. There were big rises in 1979 and 1980 due to the worldwide energy crisis and inflation. For workers and staff in the collectively owned units, the wage rate was even lower than that in the state owned units.

Corresponding to the low wage rate were the low general inflation rate and cost of industrial products. From 1950 to 1978 cost of living increased only about 45 percent, while the general price of industrial products plunged about 18 percent. Since 1979 China has experienced moderate inflation and increases in the prices of industrial products.

Based on the above analyses, the abundant cheap labor and the resulting low cost of production are indeed the most significant comparative advantage that China has. To some extent, China has been taking that advantage to export textile products, arts and crafts, and other labor intensive products. In the future it is likely to expand labor intensive industrial products such as metal products, machine tools, electronic products, and others for domestic and international markets. The improvement in education, the transfusion of modern technology, and foreign investments from advanced industrialized countries will further accelerate Chinese economic development in general and its foreign trade in particular.

China also is rich in mineral resources. The production of crude oil has been increasing rapidly in the past ten years. With the increasing interest and investments of multinational oil companies in China, its crude production is expected to continue to increase from its current rate of over 100 million tons per year. The production of some other strategic minerals is expected to increase also.

Another comparative advantage of China is its culture. The Chinese are not debt-prone people. China's basic policy is to exercise fiscal prudence domestically and internationally. Internally, the central government has always maintained approximately a balanced budget. The policy makers are willing to minimize its international balance of payment deficit or to maintain some surplus at the expense of faster economic growth through excessive borrowing. Furthermore, the Chinese love to save. In the process of economic development and increasing income, China will be able to save more and accumulate more capital for enhancing its growth needs. Finally, the Chinese have always emphasized the importance of education that, in turn, will accelerate international technological transfusion for economic development.

On the other hand, China's economic problems are multifaceted and deep-rooted. The central planning system is too rigid and inefficient. Although the current leaders have long realized the weaknesses of the system and tried to modify and improve the existing system, it is expected that progress will be slow. The backwardness of China's economy and the low standard of living are to a great extent attributable to that ineffective system and to the overemphasis of heavy industries and the defense sector from 1949 to the mid-1970s.

Under the centrally planned economy, the price system and the market mechanism are not properly working and the resources cannot be efficiently allocated. The recent development in decentralization of decision making was a first step to remedy some problems experienced in the earlier years. Increasing private ownership, private enterprise, and sideline production have been tried in recent years with some success. However, a more comprehensive balanced economic growth among difterent sectors of the economy is vital for future development.

The backwardness of the overall economy in general and the sheer size of the country make it very difficult for China to progress rapidly. The existing system is not conducive to efficient and effective management. After being more or less isolated from western industrialized countries for over two decades, the problems became deep-rooted. For example, the business practice and the legal framework are so awkward and cumbersome as to discourage foreign companies from doing business in China. China is also quite inexperienced in international marketing and international business in general.

Being weak in technology in general and the production of consumption goods in particular, China is unable to utilize its cheap labor to produce wide varieties of labor intensive products and to compete with other Asian neighboring countries such as Hong Kong, Malaysia, Singapore, South Korea, and Taiwan in the international markets. However, China appears to be learning from the success of its neighbors that international trade and technological transfusion are essential for its rapid economic growth. The recent development of special economic zones for promoting exports and attracting foreign investments is a good example.

V. CHINA'S ECONOMIC POLICY AND THE PROSPECT OF FUTURE U.S.-CHINA TRADE

From the economic viewpoint, China did learn some lessons from mistakes made during the Great Leap Forward (1958-1960) and the Cultural Revolution (1966-1975). The Fifth Five-Year Plan (1976-1980) was a transitional period. During the Great Leap Forward, China overemphasized heavy industries and capital spending at the expense of agriculture and the people's standard of living. Since 1981, agriculture has been growing rapidly at about 10 percent per year. Grain production has been moving toward self-sufficiency, while cotton has been plentiful enough for export. During the Sixth Five-Year Plan (1981-1985), light industrial production grew at the annual rate of more than 10 percent. The production of crude oil and coal has increaded at an annual rate exceeding 8 percent.

For the Seventh Five-Year Plan (1986-1990), the Central Committee of the China Communist Party proposed six major principles of economic development.[11]

The first principle is to improve working conditions and to promote steady and balanced agricultural development through government policy and science. To achieve balanced growth, farming, forestry, animal husbandry, sideline production and fishery, agriculture, industry, commerce, and transportation must be coordinated. Furthermore, the rural production must be readjusted, specialized, commercialized, and modernized.

The second principle is to increase the production of consumer goods and residential construction. The third principle is to utilize all available resources to carry out numerous key projects in energy, transportation, telecommunication, and industrial production. The fourth principle is to accelerate the development of the tertiary industry. Technological transformation is the fifth major emphasis of the current Five-Year Plan. Finally, major economic networks around large cities will be established to integrate different economic regions in the country.

China also set the target of increasing total exports and imports by 40 to 50 percent during its Seventh Five-Year Plan. China intends to increase exports of petroleum, coal, nonferrous metals, farm, textiles, and other labor-intensive industrial products. The need to import advanced technology, machinery and equipment, and other goods and services is limited only by the availability of its foreign exchange.

In brief, the analysis of the direction and composition of trade between the U.S. and the PRC will help us understand and anticipate future trade prospects between the two countries. Exports from the U.S. to the PRC reached a peak of $3.75 billion in 1980, declined to $2.17 billion in 1983, but increased to $3 billion in 1984. The decline of Chinese imports was due partly to the slowdown of the PRC's Four Modernization Program and partly to the lack of competitiveness of U.S. goods in the World Market. The devaluation of the U.S. dollar in the foreign-exchange markets since September 1985 as a result of the concerted effort of Group 5 will stimulate U.S. exports to China in the future.

Economically, 1985 was a very successful year for China. Based on some preliminary estimates, the GNP increased by 16 percent, national income advanced 12 percent, and foreign trade grew by 30 percent. It is our belief that China will continue its open door policy for many years to come. China is clearly interested in building long-term relationships[12] with its trade partners. The U.S.-China trade relation has already had a very good start as demonstrated by the recent phenomenal growth. It is our expectation that in the future China will continue to import more capital goods and modern technology to industrialize and to modernize. On the other hand, it is necessary for China to continue to import a substantial amount of agricultural products and other consumption goods to improve the Chinese living standard. The leaders as well as the majority of the population are becoming more concerned about their material well-being. Consequently, China is expected to import more capital goods and consumption goods in the future. Whether the U.S. is able to increase its exports to China depends to a large extent on the U.S. ability to compete with Japan and Western European industrialized countries for sophisticated capital goods, to advanced modern technology, and to U.S. foreign trade policy such as limiting exports of some high-tech products to China. The U.S. exports of industrial and consumption goods will face keen competition from Japan and semi-industrialized countries such as Taiwan, Hong Kong, Singapore, and South Korea. Overall, the prospect for the future of U.S.-China trade remains optimistic.

Footnotes:

1. See Gregory C. Chow, *The Chinese Economy*. New York: Harper and Row, 1985, pp. 288-91.
2. The Chinese government had never published its own estimates of national income. The estimates were made by Liu and Yeh (1973), Eckstein (1973), Perkins (1975), and Field (1980). More recent estimates can be found in *Statistical Yearbook of China*, 1981, and *Almanac of China's Economy*, 1981.
3. For detail, see *The Chinese Business Review*, May-June 1983, pp. 4-9.
4. For detail, see *TIAS 9836*.
5. Gottfried Haberler, *International Trade and Economic Development*. Cairo: National Bank of Egypt, Fiftieth Anniversary Commemoration Lectures, 1959, p. 11.
6. China was particularly sensitive to the relation and development between the U.S. and Taiwan and between Japan and Taiwan. China's trade relationship with the U.S. and Japan changed when the relationship between Taiwan and the U.S. and Japan changed. For example, when the U.S. agreed to sell more fighter planes to Taiwan, China cut its trade with the U.S.
7. Gene T. Hsiao, *The Foreign Trade of China: Policy, Law, and Practice*. Berkeley: University of California Press, 1977, Chapter 3; Charles Smith, "Japan and China," in Colina MacDongall (ed.), *Trading with China: A Practical Guide*, McGraw-Hill (UK), 1980, pp. 169-81.
8. Technology, equipment, and other capital goods are imported from foreign firms to engage in mineral, agricultural, light industrial, textile, and other industrial productions. Foreign suppliers of capital goods, equipment, and technology are paid by the outputs produced. See Terry Cannon, "Foreign Investment and Trade; Origins of the Modernization Policy," in Stephan Feuchtwang and Athar Hussain, *The Chinese Economic Reform*. New York: St. Martin's Press, 1983, pp. 317-18.
9. Foreign suppliers of materials and parts are processed and assembled in China for exports. The Chinese earned foreign exchange through processing and assembling. See Terry Cannon, op. cit., pp. 318-19.
10. A. H. Cave, "Importing from China," in Colina MacDougall (ed.), *Trading with China: A Practical Guide*, pp. 146-48.
11. *Uphold Reform and Strive for the Realization of Socialist Modernization*. Beijing: Foreign Languages Press, 1985.
12. See, for example, Rosalie L. Tung, "U.S.-China Trade Negotiations: Practice, Procedures, and Outcomes," *Journal of International Business Studies*, Fall 1982, pp. 25-37.

References:

Balassa, Bela. "Trade Policies in Developing Countries." *American Economic Review* 61 (May 1971) 178-87.

Caves, Richard E. *Trade and Economic Structure*. Cambridge: Harvard University Press, 1960.

Central Intelligence Agency. "China: Real Trends in Trade with Non-Communist Countries Since 1970." A research paper, October 1977.

_____. *China: International Trade*. Various quarters from 1979 to 1985.

Chenery, Hollis B. "Comparative Advantage and Development Policy." *American Economic Review* 51 (March 1961) 18-51.

Chinese Statistics Bureau. *Statistical Yearbook of China*. Hong Kong: Hong Kong Economic Review Publishing House, 1982.

Chow, Gregory C. *The Chinese Economy*. New York: Harper and Row, 1985.

Eckstein, A. (ed.). *Quantitative Measures of China's Economic Output*. Ann Arbor: University of Michigan Press, 1980.

Feuchtwang, Stephan, and Athar Hussain (eds.). *The Chinese Economic Reforms*. New York: St. Martin's Press, 1983.

Field, R. M. "Real Capital Formation in the People's Republic of China," in A. Eckstein (ed.), *Quantitative Measures of China's Economic Output*. Ann Arbor: University of Michigan Press, 1980, pp. 194-245.

Haberler, Gottfried. *International Trade and Economic Development*. Cairo: National Bank of Egypt, 1959.

Hsiao, Gene T. *The Foreign Trade of China: Policy, Laws, and Practice*. Berkeley: University of California Press, 1977.

Hultman, Charles W. "Exports and Economic Growth: A Survey." *Land Economics* 63 (May 1967) 148-57.

Klenner, Wolfgang, and Kurt Wiesegart. *The Chinese Economy*. New Brunswick (N.J.): Transaction Books, 1985.

Lewis, W. Arthur. "Economic Development with Unlimited Supply of Labor." *Manchester School of Economic and Social Studies* 22 (May 1954) 139-91.

Liu, T. C., and K. C. Yeh. "Chinese and Other Asian Economics: A Quantitative Evaluation." *American Economic Review* (March 1973) pp. 215-223.

Little, Ian, Tibor Scitovsky, and Maurice Scott. *Industry and Trade in Some Developing Countries*. Oxford: Oxford University Press, 1970.

Ma, Hong. *New Strategy for China's Economy*, translated by Yang Lim. Beijing: New World Press, 1983.

MacDongall, Colina (ed.). *Trading with China a Practical Guide*. McGraw-Hill (UK), 1980.

Maxwell, Neville, and Bruce McFarlane (eds.). *China's Changed Road to Development*. Oxford: Pergamon Press, 1984.

National Statistical Bureau of the People's Republic of China, "Statistical Report on the National Economy and Social Development for 1985," February 28, 1986. The report was written in Chinese.

Perkins, D. H. "Issues in the Estimation of China's National Product," in A. Eckstein (ed.), *Quantitative Measures of China's Economic Output*. Ann Arbor: University of Michigan Press, 1980, pp. 246-273.

Reynolds, Bruce L. "Economic Reforms and External Imbalance in China, 1978-81." *American Economic Review* 73 (May 1983) 325-28.

Tung, Rosalie L. "U.S.-China Trade Negotiations: Practice, Procedures and Outcomes." *Journal of International Business Studies*, Fall 1982, pp. 25-37.

_____. *Chinese Industrial Society After Mao*. Lexington: Lexington Books, 1982.

Wu, Yuan-li, and Chun-hsi Wu. *Economic Development in Southeast Asia: The Chinese Dimension*. Stanford: Hoover Institution Press, 1980.

Xue, Muqiao. *Current Economic Problems in China*, edited, translated, and with an introduction by K. K. Fung. Boulder: Westview Press, 1982.

Yu, Guangyuan. *China's Socialist Modernization*. Beijing: Foreign Language Press, 1984.

In a Chinese Village

by Hang-Sheng Cheng

This is a story of a Chinese village; it is also a story of China's current modernization program. A Buddhist saying goes: "See the universe through a grain of sand." From this simple story of a small, rather insignificant village, one may be able to obtain a glimpse of some important aspects of the vast modernization movement that is sweeping through China today and fundamentally changing the livelihood of one-fourth of mankind.

HUNGSHAN: PRE-INDUSTRIALIZATION

Hungshan is a collective farm of 845 families. It is located on the east coast of China, about 100 miles south of Shanghai, on the south shore of the Chientang River near where the river pours into the sea. Throughout history, the area has been known for a spectacular natural phenomenon: Twice a day, the tide rushes into the mouth of the river in a wall of water dozens of feet tall, foaming and thundering like ten thousand white horses galloping in a line across a battlefield. This sight has made the area a favorite tourist spot, but not Hungshan itself.

Sixteen years ago Hungshan was a mere salt marsh with a few households eking out a living by drying seawater for salt. In 1969 a dramatic change took place. During the height of the Cultural Revolution (1966-1976), a decree was issued to turn the marsh into arable land for growing food grains. In the spirit of those daring times, the decree was carried out with no consideration of the costs involved. Hordes of laborers were mobilized to build dikes, dig drainage trenches, plant legumes that thrive on salt (thus removing salt from the soil), and construct irrigation canals. Three years' hard work achieved the decree's objective: the salt marsh was turned into high-yielding rice fields. It was supposed to be another triumph of the Cultural Revolution.

Yet, despite the gigantic and successful fight against nature, it is doubtful that the effort paid off in an economic sense. Out of the huge investment in labor and capital arose the newly established Hungshan Collective Farm of a few hundred desperately poor households eking out a living by growing rice. One reason for their poverty was that the government set farm product prices so low relative to industrial prices that farm income barely reached a subsistence level. The price system in effect taxed farmers to keep down the cost of urban living. Another reason was that farm production was carried out by work brigades. Workers were paid by the hours put in, with no regard to productivity or individual initiative. The net result was that the rural standard of living remained far below that of the urban, and a nationwide household registration system kept rural populations from migrating into the cities.

INDUSTRIAL TAKE-OFF

In 1978 the new national leadership launched the Modernization drive designed to breathe new life into the national economy by dismantling the rigid Soviet-type economic structure that was erected twenty-five years earlier. Under the new policy market incentives were to replace ideological fervor as the motive force for economic activities. Bureaucratic controls over the economy were to be loosened to give private enterprises more latitude in making decisions. Individuals were to be rewarded for their productivity and initiative. A market mechanism was to be activitated to help allocate resources in a fundamentally socialist economic system. Furthermore, transformation was to be gradual, experimental, and to start from rural areas where eighty percent of the population resided.

The new wind reached Hungshan in 1980. A new team of village leaders decided that the time had come for the village to pull itself out of poverty through industrialization. Seeing the widespread shortage of building materials, they hit upon the idea of building a cement factory. A group was sent to procure technical advice from cement plants elsewhere. The collective's meager surplus fund was used as initial capital, plus a small capital loan from a government bank at zero interest. In addition, advance payments were asked of customers, who were eager to comply in order to ensure future delivery of much needed cement. The factory started operation in 1980 and was a spectacular financial success by the very next year.

Emboldened, the farm plowed profits into starting a ceramic tile factory, a slate-polishing factory, a cloth-dyeing factory, a clothes-making factory, a plastic-molding factory, a television shell factory, and a farm-machinery parts factory in the succeeding years. By late 1984 a total of 18 enterprises had been established.

In the short span of four years, the structure of the village's economic activities changed drastically. The collective farm was replaced by the Hungshan Agricultural-Industrial-Commercial Development Corporation, which serves as the holding company for the 18 separate enterprises. As the corporation's name implies, its businesses encompass three areas of economic activity. Whereas in 1978 the collective farm depended mostly on farming, five years later the corporation generated 84 percent of its 1983

Editor's Note: This paper was previously published by the Federal Reserve Bank of San Francisco as a *Weekly Letter*, November 1, 1985 and is reprinted with permission.

revenue from industry, 6 percent from commerce, and only 10 percent from agriculture. During the same period, agricultural employment fell from 80 percent of total employment to 37 percent, and industrial employment rose from 16 percent to 58 percent, while commerce and education's combined share rose from 4 to 5 percent.

With a more diversified industrial structure came the problem of securing future supplies of energy and raw materials. Given the inadequate distribution system and the distorted price structure in China, ensuring a steady supply of energy was the first requirement for sustained industrial growth. The village corporation's managers contracted to make a substantial capital investment in a small coal mine in a distant province to ensure an adequate supply of coal for the village in future years. But at times, capital alone was not enough. In one case, the corporation had to agree to help train plastic-molding technicians in another province to get the provincial authorities to supply coal to the village.

The corporation has further diversified its portfolio by, for example, investing in a large beer brewery nearby. In 1984 plans were afoot to build an eighteen-story commercial building and an air-conditioned movie theater in the county city.

Industrialization raised the village's income at a dizzying rate. From 1978 to 1983, its total net income increased 470 percent from 1.6 million yuan to 8.9 million yuan. After deducting for tax payments and the corporation's surplus funds, per capita distribution in 1983 was 860 yuan—triple the amount of 285 yuan in 1978.

WELFARE

With the higher income came improved living conditions. I was taken to see one of the eight housing developments in the extended village. These were handsome two-story prefabricated concrete houses, decorated extensively with locally produced ceramic tiles and polished slate, containing spacious and airy rooms and traditional farm-kitchen facilities (that used dried rice stalks for fuel). They were called "third generation" houses. The corporation manager proudly contrasted them with the "first generation" and "second generation" houses in the distance to show the progress that had been made in the last five years.

Inside, the houses were remarkably clean and well-furnished— suspiciously looking like model homes in U.S. new housing developments. The hosts proudly showed the visitors the new television sets, refrigerators and bicycles. Across the backyard from one main house was a low structure used for raising dozens of chickens, with light bulbs to keep them warm. The visitors were told that there were fish ponds as well as fruit orchards nearby to supply the villagers' needs.

In addition, the village has also built a four-story school building. Education from kindergarten through junior high school was free. The village did not have a high school. It provided scholarships of 300 yuan per year for students who were accepted into high schools elsewhere and 1,500 yuan per year for those who entered universities. The village also paid for 70 percent of medical expenses up to 30 yuan per illness, and 100 percent above that amount. For families of a single child, it paid 30 yuan per year up to 14 years. The village claimed not to have had a new family with more than one child in the past six years.

INCENTIVE VS. EQUITY

A great deal of credit for the village's spectacular economic success was given to entrepreneurship, and entrepreneurship was richly rewarded. In 1983 the cement factory was contracted out to a five-man management team with a target profit of 1.6 million yuan — twice the amount that was realized in 1982. Under the contract, each worker was paid a flat wage rate of 34.5 yuan per month plus a floating bonus depending on the amount by which the factory's target profit was exceeded. That year, the factory netted 2.13 million yuan in profit. As a result, the workers averaged 3,000 yuan income per person, and the five-man management team each received more than 10,000 yuan.

The clothing factory suffered losses in 1982. In 1983 the factory switched to the new incentive system. It was contracted out to a young man from a neighboring village who had had six years of clothing-sales experience. Through innovative management methods and introduction of new products (new-style shirts and ski jackets), the factory realized a 250,000 yuan profit in 1983. The manager received a total of 29,000 yuan that year, including bonus, and became the highest paid person in the village. In a country where per capita income was about 400 yuan a year, these remunerations were indeed astronomical.

Newspapers have reported these income disparities with approval and relish. These cases were cited as successes of the new incentive system. It is the government's proclaimed policy to permit a few people to get rich first in order to help everybody else get rich later.

ASSESSMENT

This story of Hungshan Village is based on data collected during a half-day visit to the village, supplemented by information contained in newspaper reports. The two sets of data are so similar that they clearly came from the same source. The dependability of that source cannot be verified. Moreover, the village was apparently displayed to visitors as a "showcase" for the new government policy's success. A cautious visitor must be wary of the information's usefulness and significance in the vast and complex country that is China.

However, there is other evidence to suggest that Hungshan's story is not an officially fabricated fantasy. Western journalists have reported similar explosions in rural industrial growth in other parts of the country. In particular, one in-depth analysis of China's economic growth by region (conducted in 1984) points to the "important role played by collective enterprises, and rural industry in particular" as a striking feature of the fastest growing provinces: Jiangsu and Zhejiang on China's east coast. Jiangsu is reported to have 68,000 rural enterprises, employing 4.35 million workers in 1984. Since 1978 the average annual output growth of these rural enterprises was nearly 25 percent,

compared to 9 percent for state enterprises in that province. In Zhejiang, which contains Hungshan Village, some 40,000 new township-run enterprises were established in 1984 alone. The Beijing Municipality, which includes Beijing (the nation's capital) and 10 surrounding counties, had 16,500 rural enterprises in 1984, up from 8,900 in 1983. On the basis of this evidence, it appears that Hungshan's story not only is not a myth, it also is not an isolated phenomenon.

More significantly, Hungshan is a concrete manifestation of what the Modernization policy intends to achieve. Perhaps, the earlier reference to a "model home" is, after all, rather appropriate in the present context. Hungshan Village and its story symbolize the ideals the nation's new leaders are stiving to attain. In a fundamental sense, these ideals are perhaps not that different from those that had prevailed for thirty years before the new leaders came into power. However, in terms of the means for achieving the goals, the departures from the old path have been significant.

From this viewpoint, the story is noteworthy because it helps highlight a few interesting points about China's Modernization drive. First, it demonstrates that by giving free rein to industrial development outside the rigidly controlled state-enterprise sector, a vast reservoir of entrepreneurship and creative energy can be released to propel the country's economic growth. Second, the deliberate allowance of income disparity has provided a large incentive for individual initiative that was absent in the old regime.

Third, rural industrial development has continued to be distinctly socialistic: the enterprises were collectively owned by village or township corporations and not by private individuals. Fourth, by encouraging rural industrial development — and thereby providing jobs where the majority of the population resides—China may be able to mitigate the ills of urban oncentration that have plagued many developing nations.

A Salary Survey of CPA Firms in the Reno/Sparks Area

*by B.J. Fuller**

In the spring of 1984 the author sampled CPA firms in the Reno/Sparks area to determine salary and fringe benefits for accountants. The need for that first survey was suggested by the many requests received from local accounting firms for data on compensation. The survey is updated annually as of July 31. The 1986 updated survey presented below included a sample of sixteen local CPA firms—all of the larger ones (those with 25 or more professional staff) and a nonrandom sample of the smaller ones. All of the firms, except two of the larger firms and three of the smaller firms, responded to the request for data.

Table 1 presents salaries for professional staff from entry level to those with five years experience. It is noted that one of the smaller firms has the highest starting salary. The larger firms' *average* salaries are higher than the smaller firms; three firms paid a premium for MBAs, and one firm also paid a premium for tax personnel.

Paid holidays ranged from six to ten and one-half days. Overtime was paid at the straight-time rate except for one firm that paid time-and-a-half.

Table 2 presents fringe benefits along with selected information on specific benefits at the eleven firms. Four of the firms included dental care as part of their health insurance plan and two of the firms included optical benefits.

Professional dues paid by the firms generally included state society and AICPA membership dues. All of the firms paid all or part of the dues for other selected civic and professional organizations to which the professional staff members belonged.

Table 3 presents a comparison between 1985 and 1986 average salaries for each of the experience levels. The difference between the salary averages is presented as a percentage increase or decrease which is compared to the cost of living index for the Reno/Sparks area.

Exhibit 1 is a graphic presentation of the increases and decreases of the current year over the prior year for the periods ended July 31, 1986 and 1985.

Exhibit 2 is a graphic comparison of wage increases of the current year over the prior year adjusted for the Reno cost of living index (real wage increase/decease) for the periods ended July 31, 1986 and 1985.

Exhibit 1
Graph of Comparison of Average Wages
By % Increase-Decrease Over Prior Year

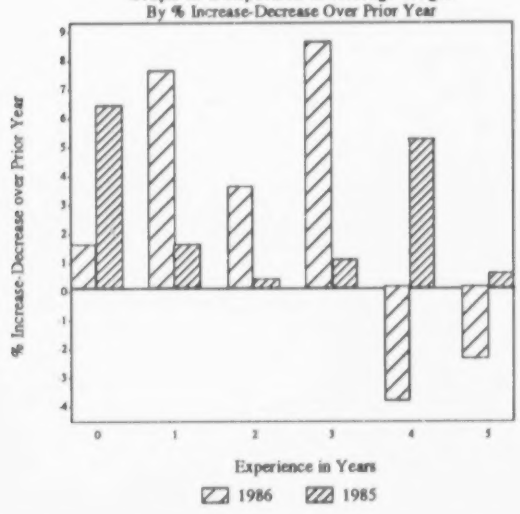
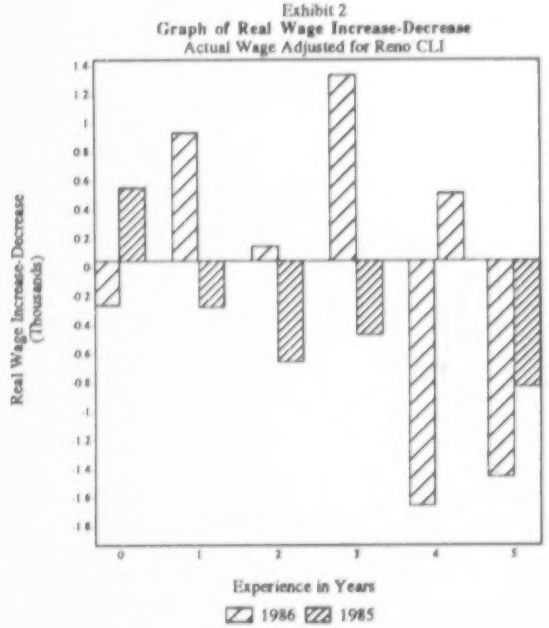


Exhibit 2
Graph of Real Wage Increase-Decrease
Actual Wage Adjusted for Reno CLI



*B.J. Fuller is Associate Professor of Accounting and Computer Information Systems, College of Business Administration, University of Nevada-Reno.

Table 1

Base Salary for Entry Level Professional Staff and Base Salary for Currently Employed Professional Staff for Five Years, Along with Other Salary Related Information

	SEVEN SMALLER FIRMS							FOUR LARGER FIRMS			
	1	2	3	4	5	6	7	1	2	3	4
Experience in Years											
0	$15,600	$20,000	$17,000	$17,000	$14,000	$18,000		$19,500	$18,500	$18,600	$18,000
1		$21,600			15,000	$19,500		21,500	20,000	20,500	20,400
2	19,800		20,000		17,000	21,250	22,500	23,600	22,000	22,500	22,000
3				22,400	30,000	23,000			25,000	25,000	24,000
4	23,400					25,000		29,000	28,000	27,500	26,000
5	26,000	28,800-35,650	27,000		Tied to Billing Rate	30,000	28,000	36,000	32,000	30,500	35,000-48,000
Frequency of Salary Review	Annually	Annually	Annually	Annually	Semi-Annual	Annually	Annually	Annually	Annually	Annually	Annually
Date of Last Review	Employee Anniv.Date	July 86	June 86	June 86	May 86	May 86	June 86	July 86	May 86	July 86	Dec 85
Paid Holidays	8	8	9	10.5	9	8	8	8	9	6	8
Overtime Premium	Yes	Yes		No		Yes			No	Yes	No
Comp Time	Yes	No	1st 80 hrs	No					Yes	No	Yes
Both (OP/CT)	Yes	No		N0	Yes		Yes	Yes		No	Yes
Manditory Comp	No	N/A		N/A					No	No	Yes
Discretion of Firm	Yes	N/A		N/A			Yes		No	No	
Discretion of Employee	Yes	N/A	Yes	N/A	Yes			Yes	Yes	Yes	
Overtime Rate					Tax Season						
Straight Time (ST)					Bonus/						
Time & one half (TH)					OT included						
Years Employed					in Base						
1	TH	ST	ST	ST	ST	ST		ST	ST	ST	ST
2	TH	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
3	TH	ST	ST	ST	ST	ST		ST	ST	ST	ST
4	TH	ST	ST	ST	ST	ST		ST	ST	ST	ST
More than 5	TH	ST	ST	ST	ST	ST	ST	ST	No	ST	No
Firm Paid Premiums											
MBA	N/A	Yes 10%	No	No	No	No	No	Yes	Yes 1,500	No	No
Tax Personnel	No	No	No	No	Yes	No	No	No	No	No	No
Management Advisory Personnel	No	No	No	No	N/A	No	No	No	Yes	No	No

Table 2

Fringe Benefits

	SEVEN SMALLER FIRMS							FOUR LARGER FIRMS			
	1	2	3	4	5	6	7	1	2	3	4
Health Insurance	X	X	X	X	X	X	X	X	X	X	X
Dental Benefits			X	X	X						X
Optical Benefits							X			X	
Life Insurance	X	X	X	X	X	X		X	X	X	X
Profit Sharing Plan		X				X					
Retirement Plan		X						X	X		X
College Tuition	Partial CPA Exam Fee Auto Reimb CPE	X Garage Parking for CPA's			CPE Some Prof. Meetings	X	X	X			CPE
Professional Dues											
State Society	X	X	1/2	X		X	X	X	X	X	X
AICPA Membership	X	X	1/2	X		X	X	X	X	X	X
NAA Dues	X	X	1/2			X	X	X	X	X	
Other	All which expose firm to business community	AGA ASWA EPC			Choice of one by staff						

Table 3

Comparative Data: Percent Increase over Prior Year, 1985 to 1986

Experience in Years	0	1	2	3	4	5
Comparison of Average Salaries						
Average Prior Year (1985)	$17,410	$18,380	$20,500	$22,930	$27,370	$31,050
Average Current Year (1986)	17,620	19,790	21,180	24,900	26,490	30,370
Difference	210	1,410	680	1,970	(880)	(680)
Percent Increase/(Decrease) over Prior Year	1.2%	7.6%	3.3%	8.6%	-3.2%	-2.2%
Cost of Living Index*	2.89%	2.89%	2.89%	2.89%	2.89%	2.89%
Real Increase/(Decrease) in Wages	(293)	879	88	1,307	(1671)	(1577)

*The index used is derived from the American Chamber of Commerce Researchers Association, All Cities Index, Reno-Sparks Area, 1st Quarter 1985 and 1986, as adapted to the Consumer Price Index for All Urban Consumers, published by the United States Department of Labor.

Table 4

Comparative Data: Percent Increase over Prior Year, 1984 to 1985

Experience in Years	0	1	2	3	4	5
Comparison of Average Salaries						
Average Prior Year (1984)	$16,320	$18,060	$20,470	$22,680	$26,050	$30,850
Average Current Year (1985)	17,410	18,380	20,500	22,930	27,370	31,050
Difference	1,090	320	30	250	1,320	200
Percent Increase/(Decrease) over Prior Year	6.68%	1.77%	0.15%	1.10%	5.07%	0.65%
Cost of Living Index*	3.40%	3.40%	3.40%	3.40%	3.40%	3.40%
Real Increase/(Decrease) in Wages	535	(294)	(666)	(521)	434	(849

*The index used is derived from the American Chamber of Commerce Researchers Association, All Cities Index, Reno-Sparks Area, 1st Quarter 1984 and 1985, as adapted to the Consumer Price Index for All Urban Consumers, published by the United States Department of Labor.

Nevada Economic Indicators

Statewide Statistical Data

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
Total Labor Force (000's)	532.5	531.0	532.4	532.0	+ 2.4	+ 3.5
Total Employment (000's)	502.5	503.8	505.7	504.0	+ 3.4	+ 6.0
Unemployment (000's)	30.0	27.8	26.7	28.2	– 12.3	– 26.3
Unemployment Rate	5.6	5.2	5.0	5.3	– 14.6	– 29.1
Unemployment Rate (Seasonally Adjusted)	5.7	5.6	5.5	5.6	– 11.6	– 29.7
Agricultural Empl. (000's)	8.0	8.6	7.0	7.9	+ 19.2	+ 2.6
Establishment Based Industrial Employment						
Total All Industries (000's)	467.7	469.6	472.8	470.0	+ 1.7	+ 4.0
Mining	6.2	6.3	6.2	6.2	+ .5	+ .5
Contract Construction	28.4	28.8	28.6	28.6	+ 9.0	+ 13.6
Manufacturing	22.6	22.6	22.4	22.5	+ 1.3	+ 1.5
Transportation & Utilities						
Transportation	15.1	15.1	15.2	15.1	+ 2.0	+ 7.8
Railroads	1.3	1.3	1.3	1.3	– 4.9	– 0.0
Air	3.6	3.6	3.6	3.6	+ 4.9	+ 21.3
Public Utilities	11.3	11.3	11.2	11.3	+ 0.0	– .3
Total Trade	95.5	95.8	96.2	95.8	+ 1.7	+ 4.0
Wholesale Trade	16.5	16.4	16.3	16.4	+ 1.0	+ 2.1
Retail Trade	79.0	79.4	79.9	79.4	+ 1.9	+ 4.4
Finance, Ins., Real Estate	23.0	23.2	23.2	23.1	+ 1.8	+ 5.3
Service Industries	207.9	208.4	208.0	208.1	+ 2.2	+ 3.9
Hotels, Amusement and Recreation Combined	133.1	133.4	132.8	133.1	+ 2.9	+ 3.1
Medical and Health	19.2	19.4	19.5	19.4	+ 1.0	+ 13.9
Total Government	57.9	58.1	61.8	59.3	– 2.7	+ 1.2
Federal	10.8	10.8	10.8	10.8	+ 1.9	+ 2.2
State and Local	47.1	47.3	51.0	48.5	– 3.6	+ 1.0
Education	18.5	18.6	22.8	20.0	– 11.1	+ 6.6
Average Weekly Earnings in Selected Industries						
Mining	594.70	613.61	620.54	609.62	+ 2.1	+ 9.9
Construction	601.88	614.51	616.77	611.05	+ 2.8	+ 2.7
Manufacturing	374.53	378.95	384.48	379.32	+ 1.9	+ 5.3
Public Utilities	534.66	545.76	569.70	550.04	+ 1.1	+ 4.5
Trade	290.49	292.74	295.65	292.96	+ 2.1	+ 3.5
Average Weekly Hours in Selected Industries						
Mining	42.6	43.0	43.7	43.1	+ 1.0	+ .4
Construction	37.5	37.7	37.7	37.6	+ 1.1	+ 4.8
Manufacturing	40.1	40.4	40.6	40.4	+ 1.0	+ 2.3
Public Utilities	39.4	40.1	39.7	39.7	+ .5	– 3.5
Trade	34.5	34.4	34.1	34.3	+ .7	– .2
Average Hourly Earnings in Selected Industries						
Mining	13.96	14.27	14.20	14.14	+ 1.1	+ 9.5
Construction	16.05	16.30	16.36	16.24	+ 1.7	– 2.1
Manufacturing	9.34	9.38	9.47	9.40	+ .9	+ 3.0
Public Utilities	13.57	13.61	14.35	13.84	+ .5	+ 8.2
Trade	8.42	8.51	8.67	8.53	+ 1.4	+ 3.7
Construction Activity						
Residential ($000's)	62,200	95,500	81,500	239,200	– 31.7	+ 25.8
Nonresidential ($000's)	67,500	27,900	37,000	132,400	– 28.1	+ 17.7
Nonbuilding ($000's)	57,600	5,200	9,900	72,700	+ 2.8	+ 29.4
Total ($000's)	187,300	128,600	128,400	444,300	– 26.6	+ 23.8
# of New Dwelling Units	1,056	806	1,180	3,044	– 39.1	– 14.2
Tax Collections ($)						
Liquor	1,180,489	1,152,657	1,063,196	3,396,342	– 3.6	– 10.9
Cigarette	1,822,214	1,622,984	1,685,804	5,131,002	+ 4.1	+ .7
Fuel	4,546,183	4,643,858	4,709,388	13,899,429	+ 7.9	+ 5.3
Quarterly Taxable Sales ($000's)	–	–	–	2,378,041	+ 4.5	+ 11.6
Quarterly Gaming Revenues ($000's)	–	–	–	914,842	+ 4.6	+ 2.8
Highway Traffic Flow						
17 Selected Stations (Avg. Daily)	150,774	159,231	134,514	148,173	+ 15.6	+ 4.5

† Revised.

Las Vegas Standard Metropolitan Statistical Area

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
Total Labor Force (000's)	303.5	302.2	304.4	303.4	+ 1.8	+ 4.0
Total Employment (000's)	284.3	284.4	287.7	285.5	+ 2.5	+ 6.7
Unemployment (000's)	19.2	17.8	16.7	17.9	– 8.0	– 25.8
Unemployment Rate	6.3	5.9	5.5	5.9	– 9.7	– 28.6
Unemployment Rate (Seasonally Adjusted)	6.3	6.0	5.7	6.0	– 11.3	– 29.4
Agricultural Employment (000's)	1.9	2.1	1.7	1.9	+ 18.8	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	264.0	264.9	268.0	265.6	+ .8	+ 4.2
Mining	.2	.2	.2	.2	– 33.3	+ 33.3
Contract Construction	17.1	17.2	17.3	17.2	+ 5.3	+ 12.4
Manufacturing	8.1	8.1	8.0	8.1	+ 0.0	+ 0.0
Transportation & Utilities						
Transportation	8.7	8.8	8.8	8.8	+ 1.9	+ 4.8
Railroads	.4	.4	.4	.4	– 0.0	– 0.0
Air	2.5	2.6	2.6	2.6	+ 5.5	+ 10.0
Public Utilities	6.1	6.1	6.1	6.1	– 0.0	+ 0.0
Total Trade	54.8	54.7	55.4	55.0	+ .5	+ 4.1
Wholesale Trade	8.9	8.7	8.7	8.8	+ .8	+ 2.7
Retail Trade	45.9	46.0	46.7	46.2	+ .5	+ 4.6
Finance, Ins., Real Estate	13.8	14.0	14.6	14.1	+ 3.7	+ 7.6
Service Industries	126.6	127.2	127.7	127.2	+ 1.2	+ 3.5
Hotels, Gaming & Recreation	81.4	82.0	82.4	81.9	+ 1.4	+ 4.2
Total Government	28.6	28.6	30.5	29.2	– 12.8	+ 4.3
Federal	5.6	5.6	5.6	5.6	+ 0.0	+ 1.8
State and Local	23.0	23.0	24.9	23.6	– 3.9	+ 4.9
Education	9.3	9.3	11.4	10.0	– 11.0	+ 7.1
Construction Activity						
Las Vegas						
Residential ($000's)	11,208	8,751	21,461	41,420	– 18.1	+ 50.7
Nonresidential ($000's)	9,334	3,080	9,357	21,771	– 64.9	+ 47.6
Total Value ($000's)	20,542	11,831	30,818	63,191	– 43.8	+ 49.6
# of New Family Units	204	167	645	1,016	– 7.0	+ 59.7
North Las Vegas						
Residential ($000's)	66	637	158	861	– 96.0	– 71.7
Nonresidential ($000's)	600	1,638	158	3,197	– 32.6	+ 26.3
Total Value ($000's)	666	2,275	1,117	4,058	– 62.8	– 27.1
# of Permits	1	9	2	12	– 93.7	– 91.8
Quarterly Taxable Sales ($000's)	–	–	–	1,281,550	+ 1.9	+ 14.7
Quarterly Gaming Revenues ($000's)	–	–	–	592,161	– 1.0	+ 6.2
Air Transportation-McCarran						
Passengers (Arr. & Depart.)	970,632	1,083,569	989,840	3,044,041	– .3	+ 12.9
Cargo Enplaned (lbs.)	1,648,731	1,918,978	1,551,022	5,118,731	– 5.2	+ 67.9
Cargo Deplaned (lbs.)	2,198,367	2,676,953	2,271,315	7,146,635	– 9.1	+ 40.6
Highway Traffic Flow						
4 Selected Stations (Avg. Daily)	40,218	42,196	35,659	39,357	+ 9.2	+ 3.6
Room Tax ($)						
Clark County	2,043,188	2,121,804	2,334,015	6,499,007	– .3	+ 16.9
Las Vegas City	290,035	324,449	287,148	901,632	– 3.8	+ 5.7
SMSA Total	2,344,023	2,460,520	2,633,750	7,438,293	– .7	+ 15.4

†Revised

Reno Standard Metropolitan Statistical Area

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
Total Labor Force (000's)	135.1	134.7	135.1	135.0	+ 2.5	+ 3.6
Total Employment (000's)	129.2	129.0	129.6	129.3	+ 3.7	+ 5.4
Unemployment (000's)	5.0	5.7	5.5	5.4	– 21.4	– 29.9
Unemployment Rate	4.4	4.3	4.1	4.3	– 17.9	– 28.1
Unemployment Rate (Seasonally Adjusted)	4.7	4.8	4.7	4.7	– 11.8	– 28.6
Agricultural Employment (000's)	1.0	1.1	.9	1.0	+ 20.0	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	127.4	128.2	128.9	128.2	+ 2.4	+ 3.4
Mining	.6	.7	.7	.7	+ 11.1	– 4.8
Contract Construction	7.1	7.3	7.2	7.2	+ 14.3	+ 11.9
Manufacturing	8.3	8.3	8.4	8.3	+ 2.9	+ .8
Transportation & Utilities						
Transportation	4.7	4.7	4.7	4.7	+ 1.4	+ 17.5
Railroads	.4	.4	.4	.4	+ 0.0	+ 0.0
Public Utilities	3.9	3.9	3.9	3.9	+ .9	+ .9
Total Trade	28.9	28.9	28.9	28.9	+ 3.2	+ 3.8
Wholesale Trade	6.6	6.6	6.6	6.6	+ 1.5	+ 3.7
Retail Trade	22.1	22.3	22.3	22.2	+ 3.4	+ 3.6
Finance, Ins., Real Estate	6.7	6.7	6.7	6.7	+ .5	+ 2.6
Service Industries	52.9	52.8	52.4	52.7	+ 2.4	+ 5.1
Hotels, Gaming & Recreation	31.3	31.1	30.6	31.0	+ 3.0	+ .4
Total Government	14.5	14.9	16.0	15.1	– 2.6	– 6.6
Federal	3.0	3.0	3.0	3.0	+ 5.9	+ 4.7
State and Local	12.5	11.9	13.0	12.5	– 1.8	– 6.5
Education	5.7	6.0	7.2	6.3	– 11.3	+ 5.6
Construction Activity						
Reno						
Residential ($000's)	4,100	11,136	5,682	20,918	– 39.9	– 42.6
Nonresidential ($000's)	6,900	6,468	13,491	26,859	– 30.6	+ 59.6
Total Value ($000's)	11,000	17,604	19,173	47,777	– 13.7	– 20.3
# of New Family Units	95	204	83	382	– 41.4	– 58.7
Sparks						
Residential ($000's)	1,134	1,123	1,808	4,065	– 49.3	– 37.2
Nonresidential ($000's)	1,062	3,598	1,807	6,467	– .1	+ 56.2
Total Value ($000's)	2,196	4,721	3,615	10,532	– 27.3	– .7
# of New Family Units	60	94	47	201	+ 5.2	+ 4.7
Washoe County (Unincorporated)						
Residential ($000's)	3,565	7,018	4,426	15,009	– 20.5	+ 2.6
Nonresidential ($000's)	1,174	812	818	2,804	+ 20.9	– 45.3
Total Value ($000's)	4,739	7,830	5,244	17,813	– 16.0	– 9.8
# of New Family Units	39	76	43	158	– 20.6	+ 3.3
Quarterly Taxable Sales ($000's)	–	–	–	594,147	+ 11.1	+ 10.3
Quarterly Gaming Revenues ($000's)	–	–	–	188,428	+ 12.1	– 2.6
Air Transportation-Reno						
Passengers (Arr. & Depart.)	269,846	306,886	271,861	848,593	+ 15.2	+ 9.6
Cargo Enplaned (lbs.)	524,067	664,866	594,461	1,783,394	– 4.9	+ 16.0
Cargo Deplaned (lbs.)	713,167	741,353	844,609	2,299,129	+ 16.2	+ 13.2
Highway Traffic Flow						
7 Selected Stations (Avg. Daily)	90,049	95,916	81,125	89,030	+ 17.4	+ 4.3
Room Tax ($)						
SMSA Total	1,019,419	1,192,479	1,292,557	3,504,455	+ 26.0	+ 5.7

† Revised.

Nevada Statistical Data by County

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
CARSON CITY						
Total Labor Force	19,560	19,530	19,370	19,486	+ 11.6	– 3.0
Total Employment	18,540	18,540	18,420	18,500	+ 1.9	+ .0
Unemployment	1,020	990	950	986	– 18.7	– 37.8
Unemployment Rate	5.2	5.1	4.9	5.1	– 19.6	– 36.1
Construction Activity						
Residential Value ($000's)	3,402	3,206	3,059	9,667	+ 21.0	+ 27.9
Nonresidential Value ($000's)	2,156	5,068	1,853	9,077	+ 145.7	+ 82.4
Total Value ($000's)	5,558	3,713	4,911	14,182	+ 21.4	+ 13.2
# of New Family Units	44	44	44	132	+ 37.5	+ 94.1
Quarterly Taxable Sales ($000's)	–	–	–	88,601	+ 15.9	+ 19.2
Quarterly Gaming Revenues ($000's)	–	–	–	11,160	+ 10.7	– 7.1
CHURCHILL						
Total Labor Force	7,000	7,050	6,840	6,963	+ 3.6	+ .3
Total Employment	6,570	6,670	6,480	6,573	+ 5.5	+ 3.6
Unemployment	430	380	360	390	– 19.9	– 35.0
Unemployment Rate	6.1	5.4	5.3	5.6	– 22.9	– 34.9
Construction Activity						
Residential Value ($000's)	213	319	27	559	– 63.3	– 39.9
Total Value ($000's)	851	319	27	1,197	– 35.2	–
# of New Family Units	3	4	1	8	– 60.0	– 33.3
Quarterly Taxable Sales ($000's)	–	–	–	25,944	+ 11.0	+ 13.9
Quarterly Gaming Revenues ($000's)	–	–	–	0	–	–
DOUGLAS						
Total Labor Force	13,700	13,730	13,620	13,683	+ 6.3	+ 1.4
Total Employment	13,150	13,180	13,090	13,140	+ 7.3	+ 2.5
Unemployment	550	550	530	543	– 13.8	– 19.3
Unemployment Rate	4.0	4.0	3.9	4.0	– 19.0	– 20.1
Quarterly Taxable Sales ($000's)	–	–	–	68,264	+ 15.0	+ 4.5
Quarterly Gaming Revenues ($000's)	–	–	–	89,962	+ 30.8	– 5.4
ELKO						
Total Labor Force	13,440	13,480	13,250	13,390	+ 4.0	+ 1.8
Total Employment	12,800	12,900	12,670	12,790	+ 5.6	+ .5
Unemployment	640	580	580	600	– 22.4	– 21.1
Unemployment Rate	4.3	4.3	4.4	4.3	– 28.2	– 25.3
Construction Activity						
Elko City						
Residential ($000's)	159	499	264	922	– 38.5	– 80.0
Nonresidential ($000's)	3,057	31	909	3,997	– 6.0	+ 874.9
Total Value ($000's)	3,215	530	1,173	4,918	– 14.5	– 2.2
# of New Dwelling Units	2	6	4	12	– 29.4	– 92.1
Quarterly Taxable Sales ($000's)	–	–	–	55,674	+ 3.6	+ .5
Quarterly Gaming Revenues ($000's)	–	–	–	22,929	+ 12.2	+ 5.4
ESMERALDA						
Total Labor Force	740	750	720	736	- .9	– 3.1
Total Employment	710	710	690	703	+ 1.9	– 1.9
Unemployment	30	40	30	33	– 9.1	– 28.6
Unemployment Rate	4.3	4.9	4.2	4.5	– 10.7	– 28.7
Taxable Sales	0	2,591	0	2,591	+ 66.9	+ 78.8
EUREKA						
Total Labor Force	1,060	1,050	1,030	1,046	+ 3.6	– 8.2
Total Employment	1,010	1,020	1,000	1,010	+ 5.9	– 6.5
Unemployment	50	30	30	36	– 35.3	– 38.9
Unemployment Rate	4.4	3.2	3.3	3.6	– 32.7	– 25.3
Taxable Sales	–	–	–	5,758	+ 70.5	+ 23.3
HUMBOLDT						
Total Labor Force	5,650	5,750	5,600	5,666	+ 5.9	+ .8
Total Employment	5,340	5,470	5,320	5,376	+ 8.4	+ 2.9
Unemployment	310	280	280	290	– 37.0	– 26.9
Unemployment Rate	5.4	4.9	5.0	5.1	– 30.5	– 27.8
Quarterly Taxable Sales ($000's)	–	–	–	28,366	+ 3.6	– 11.2
Quarterly Gaming Revenues ($000's)	–	–	–	2,628	+ 29.2	– 3.3

Nevada Statistical Data by County (Continued)

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
LANDER						
Total Labor Force	2,470	2,470	2,430	2,456	+ 4.1	+ 11.0
Total Employment	2,310	2,330	2,300	2,313	+ 7.6	+ 12.8
Unemployment	160	140	130	143	– 31.7	– 12.2
Unemployment Rate	6.4	5.7	5.2	5.8	– 35.0	– 21.7
Quarterly Taxable Sales ($000's)	–	–	–	9,151	– 6.2	– .2
LINCOLN						
Total Labor Force	2,210	2,260	2,250	2,240	+ 2.9	+ 2.6
Total Employment	2,120	2,140	2,120	2,126	+ 2.9	+ 3.4
Unemployment	90	120	130	113	+ 3.0	– 10.5
Unemployment Rate	4.2	5.3	5.6	5.0	+ 0.0	– 14.7
Quarterly Taxable Sales ($000's)	–	–	–	2,125	+ 6.4	+ 13.9
LYON						
Total Labor Force	10,460	10,430	10,240	10,376	+ 4.9	+ 8.2
Total Employment	9,880	9,890	9,720	9,830	+ 6.7	+ 10.4
Unemployment	580	540	520	546	– 20.0	– 20.8
Unemployment Rate	5.8	5.2	5.1	5.4	– 22.2	– 25.5	
Quarterly Taxable Sales ($000's)	–	–	–	16,911	* .1	+ 7.5
MINERAL						
Total Labor Force	3,190	3,200	3,200	3,196	+ 3.9	+ 6.6
Total Employment	2,980	3,010	3,020	3,003	+ 4.6	+ 8.8
Unemployment	210	190	180	193	– 6.5	– 19.4
Unemployment Rate	6.5	5.9	5.5	6.0	– 11.4	– 25.7
Quarterly Taxable Sales ($000's)	–	–	–	7,515	+ 5.2	+ 10.4
NYE						
Total Labor Force	7,100	7,040	7,000	7,046	+ 1.2	+ 4.8
Total Employment	6,640	6,630	6,650	6,640	+ 2.8	+ 5.2
Unemployment	460	410	350	406	– 19.2	– 1.6
Unemployment Rate	6.5	5.8	5.0	5.8	– 20.3	– 6.0
Quarterly Taxable Sales ($000's)	–	–	–	19,279	– 2.9	+ 10.3
Quarterly Gaming Revenues ($000's)	–	–	–	1,564	– 4.3	+ .7
PERSHING						
Total Labor Force	1,860	1,970	2,050	1,960	+ 7.3	+ 8.5
Total Employment	1,800	1,900	1,990	1,896	+ 9.2	+ 6.4
Unemployment	60	70	60	63	– 29.6	– 26.9
Unemployment Rate	3.0	3.5	3.1	3.2	– 32.4	– 32.4
Quarterly Taxable Sales ($000's)	–	–	–	8,911	+ 34.3	+ 101.4
STOREY						
Total Labor Force	940	970	970	960	+ 6.3	– 5.9
Total Employment	900	920	920	913	+ 7.0	– 2.1
Unemployment	40	50	50	46	– 6.7	– 46.2
Unemployment Rate	4.5	4.7	5.0	4.7	– 14.5	– 43.7
Quarterly Taxable Sales ($000's)	–	–	–	4,698	+ 50.7	+ 32.7
Quarterly Gaming Revenues ($000's)	–	–	–	935	+ 50.1	– .3
WHITE PINE						
Total Labor Force	4,570	4,440	4,340	4,450	+ 1.2	+ 10.1
Total Employment	4,240	4,160	4,030	4,143	+ 2.4	+ 5.0
Unemployment	330	290	310	310	– 11.4	– 27.3
Unemployment Rate	7.1	6.4	7.1	6.9	– 13.8	– 34.8
Quarterly Taxable Sales ($000's)	–	–	–	13,073	+ 21.1	– 6.9
Quarterly Gaming Revenues ($000's)	–	–	–	448	– 5.7	– 30.3

† Revised.

Selected U.S. Economic Indicators

Consumer Price Index & Indexes of Selected Categories
All Urban Consumers
(1967 = 100%)

	July 1986	August 1986	September 1986	3rd Quarter 1986	PERCENT CHANGE 2nd Quarter-1986 3rd Quarter-1986	PERCENT CHANGE 3rd Quarter-1985 3rd Quarter-1986
All Items	328.0	328.6	330.2	328.9	+ .7	+ 1.6
Food	320.1	322.7	323.2	322.0	+ 1.7	+ 4.0
Housing	361.5	362.4	363.7	362.5	+ .9	– .2
Apparel and Upkeep	203.2	207.0	212.1	207.4	+ 1.0	+ .7
Transportation	304.7	301.3	302.2	302.7	– 1.0	– 5.6
Medical Care	434.8	437.5	439.7	437.3	+ 1.7	+ 7.6

Producer Price Indexes for Selected Commodity Groupings
(1967 = 100%)

All Commodities	297.7	297.2	297.7	297.5	– .4	– 3.2
Fuel and Power	477.5	439.5	455.3	447.4	– 7.3	– 29.1
Machinery and Equipment	303.7	304.0	304.3	304.0	+ .4	+ 1.5
Metals and Metal Products	310.5	310.6	311.1	310.7	+ 0.0	– 1.3
Nonmetallic Mineral Products	352.7	351.5	351.1	351.8	– .4	+ .7
Textile Products & Apparel	211.4	211.0	210.9	211.1	– .0	+ .3

U.S. Labor Force

Civilian Labor Force (000's)	120,303	119,471	118,244	119,339	+ 1.4	+ 2.3
Total Employment (000's)	109,882	110,155	109,891	109,976	+ .9	+ 2.6
Unemployment (000's)	8,190	8,027	8,329	8,182	– .7	– 1.0
Unemployment Rate	7.0	6.7	6.8	6.8	– 3.8	– 3.3
Unemployment Rate (Seasonally Adjusted)	6.9	6.8	7.0	6.9	– 3.7	– 3.7

The Seventh International Conference on Gambling and Risk Taking

will be held from
August 23 to August 26, 1987

at the
Bally's Grand Hotel and Casino
Reno, Nevada

The co-sponsors are

The Bureau of Business and Economic Research
University of Nevada-Reno

Gaming and Wagering Business Magazine
New York

The Society for the Study of Gambling
London

The National Association for Gambling Studies
Sydney

The conference is open to academic and professional researchers, industry and government representatives, and others with an interest in the subject of gambling and risk taking as viewed from a broad variety of fields and perspectives.

It is expected that the Conference will consist of more than 40 sessions on a wide variety of topics, and that more than 100 professional papers will be presented by representatives of more than 15 countries. Topics to be covered at the Conference will include: legalization, regulation, and the status of gambling in various countries; new technologies and their effects on commercial gambling; marketing and management strategies in the gaming industries; systems and strategies for winning at various games, including sports betting, blackjack, and the stock market; normal and deviant gambling behavior; public policy issues and the spread of commercial gambling; public opinion and commercial gambling in America; prosecuting scams against gambling operations; illegal gambling in the U.S and abroad; the future of lotteries and parimutuel horse racing in this country and abroad; and many others.

For additional information concerning participation or attendance at the Conference, please write:

The Bureau of Business and Economic Research
University of Nevada-Reno
Reno, Nevada 89557-0016
(702) 784-6877

DATA SOURCES

Information for statistical tables were developed in cooperation with the following sources:

Airport Authority of Washoe County; Carson City Department of Public Works; Churchill County; City of Elko; City of Las Vegas, Nevada Building and Safety; City of North Las Vegas; City of Reno, Building and Safety Department; City of Sparks; Clark County Department of Aviation; Las Vegas Convention/Visitors Authority; Nevada Power Co.; Reno-Sparks Convention/Visitors Authority; State of Nevada Department of Taxation; State of Nevada Department of Transportation; State of Nevada Employment Security Department; State of Nevada State Gaming Control Board; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; Washoe County Building and Safety Division; White Pine County Regional Planning Commission.

Nevada Review of
BUSINESS & ECONOMICS

Bureau of Business and Economic Research
College of Business Administration
University of Nevada-Reno
Reno, Nevada 89557-0016

CONGRESS INFO SERV
SRI
4520 EAST WEST HWY
BETHESDA MD 20814

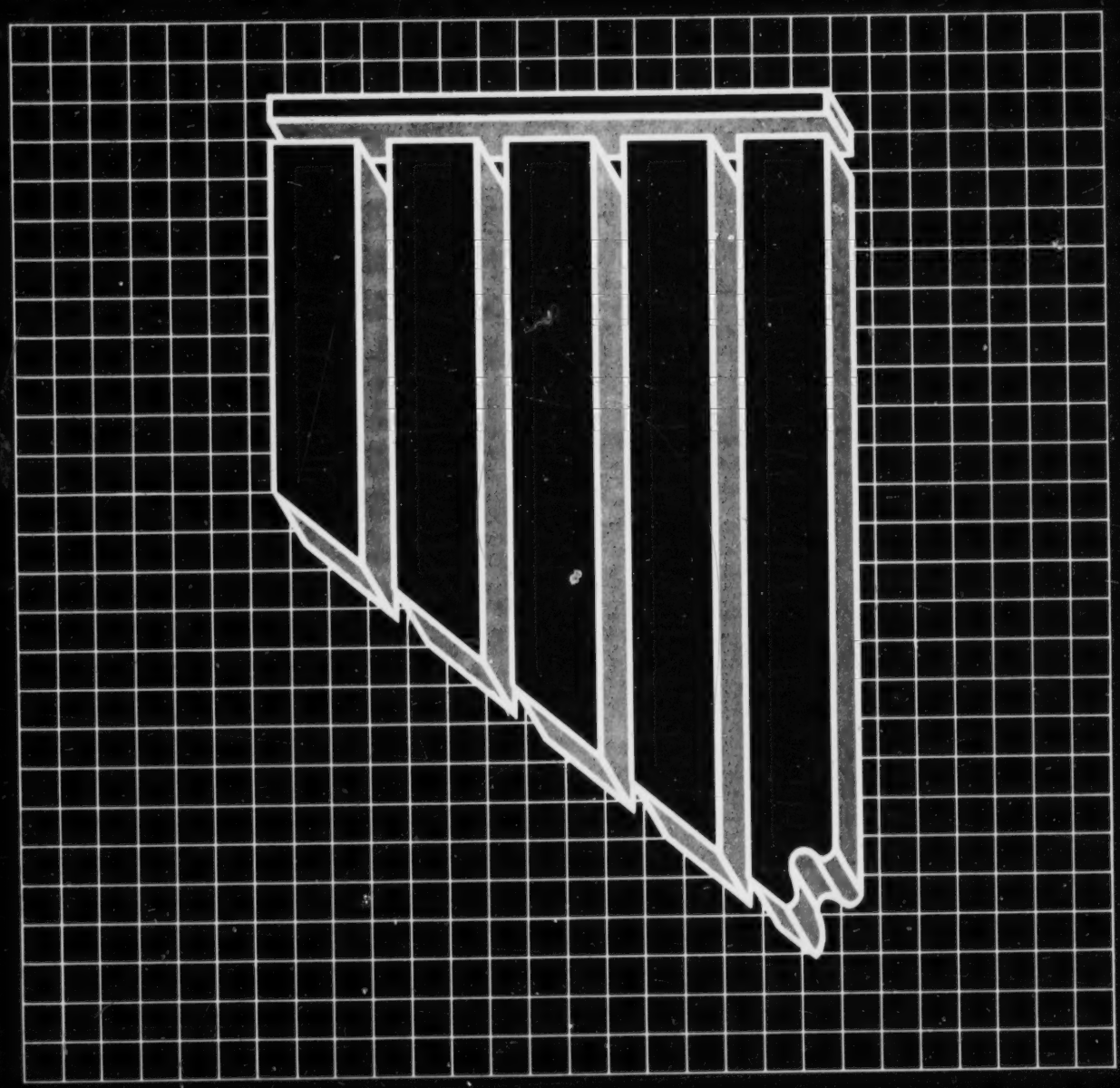
U7920-1
9/28/87

Spring 1987

Volume XI, No. 2

Nevada Review of BUSINESS & ECONOMICS

Bureau of Business & Economic Research • College of Business Administration • University of Nevada-Reno



Nevada Review of
BUSINESS & ECONOMICS

University of Nevada-Reno
Joseph N. Crowley, *President*

College of Business Administration
Henry Amato, *Dean*

Bureau of Business and Economic Research
David R. Seymour, *Director*
Thomas F. Cargill, *Editor*

Research Staff:
Ellen M. Jacobson
Assistant Director of Research
Bill Heppe
Martin Kyte
Rob Martin
Rex Massey
Peggy Ries

Staff:
Barb Glazner
Assistant to the Editor

Nevada Review of Business and Economics
A Quarterly Publication
(ISSN 0148-5881)

Copyright 1986 by
Bureau of Business and Economic Research
University of Nevada-Reno

POSTMASTER:

Please send Form 3759 to:

Bureau of Business and Economic Research
University of Nevada-Reno
Reno, NV 89557-0016

Phone: (702) 784-6877

Second Class Postage Paid at Reno, NV

Editorial Advisory Board

Glen Atkinson, Professor of Economics, University of Nevada-Reno, NV.

William Bible, Director, State of Nevada, Department of Administration, Carson City, NV.

William R. Eadington, Professor of Economics, University of Nevada-Reno, NV.

Kyung-Il (Ed) Ghymn, Professor of Managerial Sciences, University of Nevada-Reno, NV

Andrew Grose, Executive Director, State of Nevada, Commission on Economic Development, Carson City, NV.

Thomas Harris, Associate Professor of Agricultural Economics, University of Nevada-Reno, NV.

William S. Hallagan, Associate Professor of Economics, Washington State University, Pullman, WA.

Gary Horton, Financial Economist, Nevada National Bank, Reno, NV.

Michael C. Keeley, Senior Economist, Federal Reserve Bank of San Francisco, CA.

Robert A. Meyer, Jr., Associate Dean, School of Business Administration, University of California, Berkeley, CA.

Lee R. McPheters, Director, Bureau of Business and Economic Research, Arizona State University, Tempe, AZ.

Harold C. Nathan, Senior Financial Economist, Wells Fargo Bank, N.A., San Francisco, CA.

William J. Robinson, Director, Center for Business and Economic Research, University of Nevada-Las Vegas, NV.

Kambiz Raffiee, Assistant Professor of Economics, University of Nevada-Reno, NV.

John M. Strefeler, Associate Professor of Accounting and Information Systems, University of Nevada-Reno, NV.

Robert C. Weems, Dean Emeritus, College of Business Administration, University of Nevada-Reno, NV.

Sam E. White, Associate Dean of Undergraduate Programs and Associate Professor of Business Administration, Portland State University, Portland, OR.

Richard E. Wilson, Associate Professor of Economics, University of Nevada-Reno, NV.

Ted Mitchell, Associate Professor of Marketing, University of Nevada-Reno, NV.

Ted Cummings, Assistant Dean, College of Business & Economics, University of Nevada-Las Vegas, NV.

Gary Walton, Dean, Graduate School of Administration, University of California, Davis, CA.

James Hanna, State of Nevada, Employment Security Research, Carson City, NV.

CONTENTS

Changes in Sectoral Employment and Income Structure in Nevada Counties: A Shift-Share Analysis 2
Martha M. Roberts, Thomas R. Harris, and Nwalozieuwa O. Eke

Aspects of American Economic Renewal 13
Terence A. Brady

The Policy Implications of and Experience with, Preparer Penalties 21
Edward J. Schnee, Kathleen J. Bindon, and Craig A. Ellis

Nevada Economic Indicators:
- Statewide Statistical Data 31
- Las Vegas SMSA Data 32
- Reno SMSA Data 33
- Nevada Statistical Data by County 34

Selected U.S. Economic Indicators 36

General Editorial Policy

The *Nevada Review of Business and Economics* is a quarterly publication of the Bureau of Business and Economic Research, College of Business Administration, University of Nevada-Reno. Articles published in the *Review* are refereed and subject to United States copyright laws. The *Review* seeks to publish articles that focus on the business and economic environment of Nevada and the Western Region of the United States. Papers that focus on national or international topics will also be considered for publication if they either relate the topic to business and economic concerns of the Western Region or deal with a topic of sufficient interest to the Western Region. Papers can be nonquantitative or quantitative; however, in both cases, papers should focus on policy issues regarding the business and economic environment. In the case of quantitative papers, technical discussions should not be the focal point of the paper; and those cases where technical discussions are necessary, they may be more appropriately relegated to a technical appendix. The editorial policy of the *Review* is designed to reflect the interests of the readership which consists primarily of professionals in the business community, government officials and policymakers, and academics in Nevada and the Western Region of the United States. All manuscripts should be addressed to the Editor, *Nevada Review of Business and Economics*, Bureau of Business and Economic Research, University of Nevada-Reno, Reno, Nevada 89557-0016.

Changes in Sectoral Employment and Income Structure in Nevada Counties: A Shift-Share Analysis

*by Martha M. Roberts, Thomas R. Harris, and Nwalozieuwa O. Eke**

Introduction

Between 1980 and 1984, Nevada's population increased by nearly 15 percent, gaining over 77,000 new residents from net migration (excess of persons moving to Nevada over those moving away). From 1970 to 1984, Nevada's labor force more than doubled, growing from 218,300 to 496,000. Current forecasts project that Nevada's resident population will continue to grow faster than the national average, and that from 1984 to 1990, 138,000 new jobs will have been created (Nevada Employment Security Department, 1986). However, during the first three years of the 1980's, Nevada experienced a slowdown in economic activity. This slowdown can be attributed to a national recession and to the opening of Atlantic City casinos.

With a large percentage of total employment in Nevada's urban economies in the casino gaming sector and the rural economies in mining and agriculture, decision makers have prioritized the goal of economic diversification for the state of Nevada. During the 1983 biennium, the Nevada legislature created the Nevada Commission on Economic Development. The responsibility of this agency was to develop and implement a statewide plan for economic development and diversification. Not only has such a statewide plan been created, many counties in Nevada, especially in rural Nevada, have also formed economic development authorities to target economic development and diversification efforts.

Industrialization, including the attraction and location of new industries or expansion of existing ones, has come to be accepted as an effective method of achieving economic development. Since development participants, especially those in rural Nevada counties, have limited resources to commit to industrialization, industries which will most likely bring the greatest returns to those resources and consequently contribute most to economic growth need to be identified. The first step is to describe the historical changes and present composition of industries in Nevada counties, including how counties differ from one another, with the objective being to identify those industries in a county that have relatively high growth rates. The second step is to determine the reasons why the county's comparative or relative advantage exists and to identify reasons for the existing local industrial structure. This involves an assessment of the region's available human resources (including management and labor skills), natural resources (both product inputs and energy resources), plant equipment and technology, transportation facilities and access to markets, financial capacity (governmental and private), and other location characteristics. This information makes possible the identification of industry or business types whose future location or expansion could be economically feasible. The third step involves a study of the economic impact of these industry types to identify which of their locations or expansions would be most conducive to achieving local growth goals.

The first step, understanding historical changes and the present composition of state and county industries, is therefore necessary prior to action by the state and/or local economic development participants. One methodology that accomplishes this is shift-share analysis, developed by Edgar S. Dunn (Dunn, 1960). Shift-share analysis makes it possible to compare one region's past performance with that of another. It measures the growth differentials that exist between regions by using the larger economic entity, usually the national economy, as a reference or standard of comparison. Relative strengths and weaknesses in industrial structure are derived, as well as a region's relative competitiveness within the large economic entity for those industries that make up its particular mix of industries.

As Shaffer, et al. (1976) note, information generated by shift-share analysis provides initial and tentative answers to the following policy questions:

1. What type of growth would have occurred in the region if local businesses had grown as fast as those in the reference area or encompassing economy average for similar businesses?

2. Does the region have an adverse industrial mix?

3. If so, what type of growth would have occurred if the region had a more dynamic industrial composition?

4. Is the region competitive for its mix of industries relative to other regions?

* Martha M. Roberts, Thomas R. Harris, and Nwalozieuwa O. Eke are former Graduate Student, Associate Professor, and Research Associate, respectively, in the Department of Agricultural Economics at the University of Nevada-Reno. This report was prepared under University of Nevada Agricultural Experiment Station Project No. 206.

5. The location or expansion of which businesses or industries would likely add most to growth in the future?

6. The location or expansion of which businesses or industries would most bolster the industry structure of the region?

Therefore the overall objective of this study is to describe in detail the economic structure and past growth of Nevada and Nevada counties between 1977 and 1984 in such a way as to identify the factors that underlie this change. In pursuance of this objective the paper is divided into four parts. First, a discussion of the components of shift-share analysis. Second, a description of the data used to perform shift-share analysis. Third, trends in income and employment in Nevada from 1977 to 1984. Finally, results of the shift-share analysis and the economic sectors which contribute most to the growth or decline in Nevada counties.

Description of the Shift-Share Components

Shift-share analysis is based on a set of identity equations, each of which depicts some aspect of economic growth.[1] The components of growth in Nevada and Nevada counties within the context of national growth are (1) the effect of national overall growth rate component (SG); (2) the difference in the industrial structure or composition of Nevada or a Nevada county and the nation, the industrial mix component (IM); and (3) the amount of growth not due to nationwide growth or industry wide growth, the county share component (CS).

The algebraic shift-share equation for the three components of growth occurring in the i-th sector of the j-th county during the period of analysis can be written as:

$$AG_j = \sum_{i=1}^{n} (SG_{ij} + IM_{ij} + CS_{ij}) \qquad (1)$$

where AG_j is the Actual Growth in the j-th county, SG_{ij} is the Standard Growth rate by economic sector i in county j, IM_{ij} is the Industrial Mix component of economic sector i in county j, CS_{ij} is the County Share component of economic sector i in county j, and n is the number of economic sectors in county j.

Standard Growth Rate Component

The standard growth rate component reflects expected growth in the study area had it grown at the same rate as the nation. Standard growth effects are calculated by multiplying the base year (1977) employment or income in each economic sector of the study area by growth rate of total national employment or income between the base year and the terminal years (1977-1984). The results are summed over all study area economic sectors to give employment or income change due to standard growth rate component.

Industrial Mix Component

Industry mix refers to the initial industrial structure of the particular region. The purpose of the industry mix component is to measure the influence of fast or slow growing industries within a county. If an area is growing faster than the national average it may be due, in part, to a concentration of rapid or slow growth industries. For example, the service sector of the national economy has been the fastest growing of all economic sectors in recent years, and a large proportion of Nevada's total economy is in the service related industries. Therefore, it would not be surprising to see Nevada's rate of economic growth far exceeding national growth. However, this might not be a sign of a healthy economy because a reversal in this one area could cause an economic reversal. By isolating the industry mix component it becomes clearer where positive and diversified growth is taking place.

County Share Component

County Share Component is often considered at the economic sector level to be most important in terms of regional development. A positive sectoral county share component (sometimes called Competitive Share Componenet) has been interpreted as an indicator of a county's competitiveness with other counties for a particular economic sector. County share, therefore, is considered by many economists to be the dynamic element in county employment and income increases and the main component to be considered in any economic development plan (Andrikopoulos, 1977; Curtis, 1972; Kalbacher, 1979; Petrulis, 1979).

Differential Growth

Using procedures developed by Weber et al. (1984), shift-share analysis can be further simplified to highlight a county's growth differential rather than the industry mix. This simplification is done by combining standard growth and industry mix into a single figure which is referred to as "expected growth," with county share being denoted as "growth differential." Therefore, the shift-share formulation becomes:

$$AG_j = \sum_{i=1}^{n} (EG_{ij} + DG_{ij}) \qquad (2)$$

where AG_j is the Actual Growth in the j-th county, EG_{ij} is the Expected Growth of econmic sector i in county j, and DG_{ij} is the Differential Growth of economic sector i in county j.

This "growth differential" provides an indication of how growth, either by economic sector or county, compares to counterparts in the national economy. Weber et al. (1984) wrote that one drawback of equation (2) is that the terms are expressed either as dollars in the case of income, or absolute numbers in the case of employment. In order to facilitate intercounty comparisons it is necessary to convert these numbers into relative figures. A relative index is computed by dividing the sectoral and county differentials by total county income or employment in the base year. The results are called the Sectoral Differential Growth Rate (SDGR)

and the County Differential Growth Rate (CDGR). These are derived as:

$$SDGR_{ij} = \frac{SGD_{ij}}{TCBY_j} \quad (3)$$

$$CDGR_j = \frac{CGD_j}{TCBY_j} \quad (4)$$

where, $SDGR_{ij}$ is Sectoral Income (Employment) Differential Growth Rate for economic sector i in county j, SGD_{ij} is Sectoral Income (Employment) Growth Differential for economic sector i in county j, $CDGR_j$ is County Income (Employment) Differential Growth Rate in county j , CGD_j is County Income (Employment) Growth Differential in county j, and $TCBY_j$ is Total County Income (Employment) in Base Year in county j.

In other words, $SDGR_{ij}$ measures the contribution of the i-th sector to the $CDGR_j$ of the county. This relationship is important for community development planners because $SDGR_{ij}$ indicates which sectors are contributing the most to growth or those which are resistant to economic declines so that these economic sectors can be targeted. Similar sectoral differential growth rates can identify weaker sectors so steps can be taken to strengthen these industries.

Care must be taken in interpreting these growth differentials. There is a tendency to view positive differentials as a sign of comparative advantage. That is, the assumption could be made, and sometimes is in shift-share studies, that a county (region) with a positive County Growth Differential has a certain set of advantages which gives it an edge over other regions in certain economic activities. These advantages may come from a locational edge; such as access to markets, availability and price of the factors of production, and economies of scale (Petrulis, 1979). Other advantages might include unique labor/management relationships, beneficial tax laws, and the development of the local human and natural resource base (Rones, 1986). A positive CGD or SGD might indeed indicate such advantages, but sometimes this might be heroic. Even more heroic is the assertion made by some shift-share advocates that positive differential growth components indicate further economic well being. The trend may very well exist, but one should be hesitant in making such claims. Sizeable differentials, however, would seem to warrant attention, because at the minimum they do identify sectors which have shown unexpected growth, given previous development patterns.

The time periods chosen for this study are the years between 1977 and 1984. Any period could have been used as long as there was sufficient time between the two reference points to allow a smoothing of cyclical patterns.

Description of Data

Most shift-share studies utilize employment data as the unit of measure to reflect the economic activity and growth of the study region. Employment is an important aspect of economic growth and employment data are readily available. However, employment data do not reflect growth in economic sectors which experience rapid productivity increases while at the same time reducing or not growing in employment. Agriculture is an example; increased mechanization has meant decreasing demands for labor because those who are involved have been becoming more highly skilled and more productive. Another example of employment data misrepresenting the growth in an industry is in manufacturing. Where employment is decreasing, labor is becoming more highly-skilled, more productive, and receiving higher wages. To elucidate these aspects of economic growth, wage data were used along with employment data in this study.

The Bureau of Economic Analysis provides two series of consistent economic data by industry group for individual counties: both income and employment. The BEA reports estimate for both income and employment by place of work for twelve major industry groups. To avoid disclosure of confidential information the BEA releases estimates at the one-digit Standard Industrial Classification (SIC) code level. The twelve sectors used are 1) Farm; 2) Agricultural Services, Forestry, Fisheries, and Other; 3) Mining; 4) Construction; 5) Manufacturing (durable and non-durable goods); 6) Transportation and Public Utilities; 7) Wholesale Trade; 8) Retail Trade; 9) Finance, Insurance, and Real Estate; 10) Services; 11) Federal Government (Civilian and Military); and 12) State and Local Government. Total employment includes wage and salary jobs (full and part-time), plus the number of proprietors. Total income includes wage and salary earnings, other labor income, and proprietors' income.

State of Nevada Economic Trends

Sectoral and total income and employment trends over the study period of 1977-1984 for both the United States and the state of Nevada are presented in Tables 1, 2, 3, and 4. Tables 1 and 2 show national and state of Nevada sectoral real income growth, while Tables 3 and 4 show employment changes. For the nation during the study period, real income increased by 7.39 percent, while for Nevada real income increased by 25.03 percent. As for total employment growth, national employment increased by 17.35 percent from 1977 to 1984, while Nevada's employment increased by 53.87 percent during the same time period. The state's growth in real income and employment can be attributed to the large increase in population and economic activity that occurred during this study period.

From these tables it is apparent that the composition of Nevada's economy was similar to that of the United States with two striking exceptions. Nationally in 1984, manufacturing's proportionate share of total national employment and income was approximately 20 percent, while in Nevada manufacturing industries comprised approximately only 5 percent of total state employment and income. The other major difference was in the area of service based industries. In Nevada, service industries' proportionate share of total state employment and income was approximately 40 percent, while nationally the service sector's proportionate

Table 1

Income by Sources for the United States, 1977 and 1984[a]

	Sector	Income 1977	Percent of Total Income	Income 1984	Percent of Total Income	Growth Rate 1977-1984
		($1,000)	(%)	($1,000)	(%)	(%)
1)	Farm	14,525,069	2.25	12,685,310	1.83	-12.67
2)	Agricultural Services, Forestry, Fisheries, and Other	2,688,705	.42	2,928,640	.42	8.92
3)	Mining	9,909,642	1.54	11,171,006	1.61	12.73
4)	Construction	37,930,028	5.88	37,591,128	5.43	-0.89
5)	Manufacturing	168,966,391	26.19	165,008,357	23.82	-2.34
6)	Transportation and Public Utilities	48,900,275	7.60	52,300,868	7.55	6.95
7)	Wholesale Trade	42,163,636	6.55	46,544,198	6.72	10.39
8)	Retail Trade	65,520,661	10.16	66,394,728	9.58	1.33
9)	Finance, Insurance, and Real Estate	36,234,711	5.62	43,772,742	6.32	20.80
10)	Services	106,510,744	16.51	140,716,490	20.31	32.11
11)	Civilian and Military Federal Government	37,607,714	5.83	37,431,051	5.40	-0.47
12)	State and Local Government	74,137,190	11.49	76,191,257	11.00	2.77
	Total	645,094,766	100.00[b]	692,735,775	100.00[b]	7.39

[a]Income data refers to labor and proprietors' income presented in each sector at the national, state, and county level by the Bureau of Economic Analysis. Income figures are expressed in 1967 dollars and thousands of dollars.

[b]Totals may not sum to 100 percent because of rounding.

Source: U.S. Department of Commerce. *Local Area Personal Income: 1977-1982. Far West Region.* Bureau of Economic Analysis, 1984.
U.S. Department of Commerce. *Local Area Personal Income: 1979-1984. Far West Region.* Bureau of Economic Analysis, 1986.

Table 2

Income by Sources for the State of Nevada, 1977 and 1984[a]

	Sector	Income 1977	Percent of Total Income	Income 1984	Percent of Total Income	Growth Rate 1977-1984
		($1,000)	(%)	($1,000)	(%)	(%)
1)	Farm	19,422	.84	15,980	.55	-17.81
2)	Agricultural Services, Forestry, Fisheries, and Other	7,008	.30	9,782	.34	39.58
3)	Mining	35,514	1.53	56,540	1.95	59.20
4)	Construction	213,900	9.23	199,254	6.88	-6.85
5)	Manufacturing	119,167	5.14	161,596	5.58	35.60
6)	Transportation and Public Utilities	188,248	8.12	239,402	8.26	27.17
7)	Wholesale Trade	82,430	3.56	111,544	3.85	35.32
8)	Retail Trade	263,081	11.35	306,657	10.58	16.56
9)	Finance, Insurance, and Real Estate	102,951	4.44	124,301	4.29	20.74

Continued next page

Table 2 *(continued from page 4)*

10)	Services	867,310	37.43	1,189,107	41.04	37.10
11)	Civilian and Military Federal Government	151,381	6.53	158,060	5.45	4.41
12)	State and Local Government	266,729	11.51	324,830	11.21	21.78
	Total	2,317,161	100.00[b]	2,897,053	100.00[b]	25.03

[a]Income data refers to labor and proprietors' income presented in each sector at the national, state, and county level by the Bureau of Economic Analysis. Income figures are expressed in 1967 dollars and thousands of dollars.

[b]Totals may not sum to 100 percent because of rounding.

Source: U.S. Department of Commerce. *Local Area Personal Income: 1977-1982. Far West Region.* Bureau of Economic Analysis, 1984.
U.S. Department of Commerce. *Local Area Personal Income: 1979-1984. Far West Region.* Bureau of Economic Analysis, 1986.

Table 3

Sectoral Employment for the United States, 1977 - 1984[a]

	Sector	Number Employed 1977	Percent of Total	Number Employed 1984	Percent of Total	Growth Rate 1977-1984
			%		%	%
1)	Farm	1,326,293	1.65	1,215,406	1.29	-8.36
2)	Agricultural Services, Forestry, Fisheries, and Other	490,639	.61	789,609	.84	6-0.94
3)	Mining	431,232	.54	719,298	.76	6-6.80
4)	Construction	3,824,242	4.76	4,612,202	4.89	2-0.60
5)	Manufacturing	15,698,041	19.55	15,463,839	16.41	-1.49
6)	Transportation and Public Utilities	4,215,614	5.25	4,690,881	4.98	1-1.27
7)	Wholesale Trade	4,367,176	5.44	5,186,389	5.50	1-8.76
8)	Retail Trade	12,831,881	16.00	15,500,007	16.45	2-0.79
9)	Finance, Insurance, and Real Estate	5,535,676	6.90	7,275,848	7.72	3-1.44
10)	Services	17,448,029	21.72	23,918,242	25.38	3-7.08
11)	Civilian and Military Federal Government	4,464,002	5.56	4,741,829	5.03	6.22
12)	State and Local Government	9,682,535	12.06	10,135,143	10.75	4.67
	Total	80,315,360	100.00[b]	94,248,693	100.00[b]	1-7.35

[a]Employment data refers to wage and salary jobs (full and part time) plus number of proprietors presented in each sector at the national, state and county level by the Bureau of Economic Analysis.

[b]Totals may not sum to 100 percent because of rounding.

Source: U.S. Department of Commerce. *Regional Economic Information System.* Bureau of Economic Analysis, 1986.

Table 4

Sectoral Employment for the State of Nevada, 1977 and 1984[a]

	Sector	Number Employed 1977	Percent of Total	Number Employed 1984	Percent of Total	Growth Rate 1977-1984
			%		%	%
1)	Farm	2,660.0	.80	4,025.0	.79	51.32
2)	Agricultural Services, Forestry, Fisheries, and Other	1,001.0	.30	3,460.0	.68	245.65
3)	Mining	4,320.0	1.31	6,993.0	1.38	61.88
4)	Construction	19,828.0	6.00	26,670.0	5.25	34.51
5)	Manufacturing	15,180.0	4.59	22,026.0	4.33	45.10
6)	Transportation and Public Utilities	18,856.0	5.71	26,163.0	5.15	38.75
7)	Wholesale Trade	10,055.0	3.04	15,424.0	3.03	53.40
8)	Retail Trade	51,181.0	15.49	79,802.0	15.70	55.92
9)	Finance, Insurance, and Real Estate	13,459.0	4.07	34,860.0	6.85	159.01
10)	Services	130,058.0	39.36	214,196.0	42.12	64.69
11)	Civilian and Military Federal Government	21,278.0	6.44	24,011.0	4.72	12.84
12)	State and Local Government	42,580.0	12.89	50,850.0	10.00	19.42
	Total	330,456.0	100.00[b]	508,480.0	100.00[b]	53.87

[a]Employment data refers to wage and salary jobs (full and part-time) plus number of proprietors presented in each sector at the national, state, and county level by the Bureau of Economics Analysis.

[b]Totals may not sum to 100 percent because of rounding.

Source: U.S. Department of Commerce. *Regional Economic Information System.* Bureau of Economic Analysis, 1986.

share of national employment and income was approximately 25 percent and 20 percent, respectively.

Nevada's heavy dependence on gaming and related tourist activities is the obvious explanation for the latter divergence. In the case of manufacturing, an explanation is more difficult to discern. Locational factors are probably the primary explanations for this variation from the national composition. Access to major markets is not readily available in Nevada, and neither is the workforce necessary for large scale manufacturing. The interesting aspect of this situation, however, was the growth rate of the manufacturing sector of Nevada's economy compared to the national growth rate. Nationally manufacturing employment and income had declining growth rates, while Nevada's manufacturing employment and income grew approximately 35 percent and 45 percent, respectively, from 1977 to 1984.

The same was true in almost all of the twelve sectors. With only minor exceptions the rate of growth in Nevada was greater, or the rate of decline much less, than that of the nation as a whole. Statewide growth for employment and income was almost four times the national average. Some of the greater growth in particular sectors is directly attributable to increased local demands from the population increase. Transportation and public utilities, wholesale trade, retail trade, finance, insurance and real estate, as well as state and local government will most likely increase with sizeable population growth. Mining is one sector where Nevada has some degree of comparative advantage. The advantage, of course, has limited value whenever the metal markets slump. The effects of fluctuating metal prices will become apparent in the examination of county by county growth rate differentials.

Shift-Share Analysis

Results of the shift-share analysis, which depicts employment and wage growth in Nevada and Nevada's seventeen counties from 1978 to 1984, using the U.S. as the reference area, are presented in this section.

Overall Growth Components

Tables 5 and 6 contain information on the growth components by actual growth, expected growth, and growth differentials for all seventeen counties in Nevada, as well as for the state as a whole. The numbers in these tables represent real income (1967 dollars) and employment growth. For the state of Nevada, state income and actual employment growth were greater than the growth that would have been expected given national sectoral trends and state sectoral composition in 1977. This result was somewhat expected given the economic and population growth that has occurred in the state during the 1970s and 1980s. In comparing

Tables 5 and 6, results as to county income and actual and expected employment growth differ, which hearkens back to the previous discussion pertaining to the use of employment and income data for shift-share analysis. Information contained in Table 5, based on income data, indicated that for thirteen of Nevada's seventeen counties, actual growth exceeded the growth which would have been expected given national sectoral trends and county sectoral composition in 1977. However, information in Table 6, based on employment, indicated that sixteen of Nevada's seventeen counties experienced actual growth that exceeded the growth that was expected given national sectoral trends and county composition in 1977. From the income data, Churchill, Mineral, Pershing, and White Pine counties experienced actual growth lower than expected, while for employment data only White Pine county experienced actual growth lower than expected. For Churchill and Pershing counties the effects of the current agricultural financial crisis affected the income shift-share results for these counties.

Results from Tables 5 and 6 can provide information as to historical growth for different counties in Nevada. Based on national trends and sectoral composition for Carson City, for example, income was expected to increase by approximately seven million dollars, however, actual growth was almost eighteen million dollars, leaving a growth differential of almost eleven million dollars. The same disparity can be seen in Table 6 for employment. It was expected that Carson City would realize an increase of 1,966 jobs. The actual number of jobs increased by 7,310 which represents a growth differential of 5,344 jobs.

Table 5

Income Growth Components for the State of Nevada and Nevada Counties, 1977-1984[a]

	County	Actual Growth	Expected Growth ($1,000)	County Growth Differential
1)	Carson City	17,895	6,895	11,000
2)	Churchill	466	1,128	-662
3)	Clark	340,194	199,063	141,131
4)	Douglas	21,509	16,117	5,391
5)	Elko	15,847	5,425	10,422
6)	Esmeralda	2,494	105	2,389
7)	Eureka	2,759	345	2,414
8)	Humboldt	5,939	1,361	4,578
9)	Lander	3,517	890	2,627
10)	Lincoln	9,089	354	8,735
11)	Lyon	2,253	1,680	573
12)	Mineral	828	699	129
13)	Nye	38,491	12,779	25,712
14)	Pershing	-303	193	-495
15)	Storey	2,036	127	1,909
16)	Washoe	122,344	81,378	40,966
17)	White Pine	-4,905	1,925	-6,829
	State	579,893	329,776	250,117

[a]Income expressed in 1967 real dollars.

Table 6

Employment Growth Components for the State of Nevada and Nevada Counties, 1977-1984

	County	Actual Growth	Expected Growth	County Growth Differential
1)	Carson City	7,310	1,966	5,344
2)	Churchill	1,632	760	872
3)	Clark	98,415	43,284	55,131
4)	Douglas	8,384	3,802	4,582
5)	Elko	5,128	1,550	3,578
6)	Esmeralda	220	34	185
7)	Eureka	400	190	210
8)	Humboldt	2,121	604	1,517
9)	Lander	763	487	276
10)	Lincoln	1,172	180	991
11)	Lyon	2,453	439	2,014
12)	Mineral	640	330	310
13)	Nye	4,832	1,792	3,040
14)	Pershing	503	145	358
15)	Storey	446	66	380
16)	Washoe	44,418	20,910	23,508
17)	White Pine	105	870	-765
	State	178,024	77,561	100,463

In order to facilitate cross-county comparisons, income and actual employment growth rates, expected growth rates, and county differential growth rates from 1977 to 1984 for Nevada and Nevada's seventeen counties are shown in Tables 7 and 8. As can be seen from Table 7, Churchill, Mineral, Pershing, and White Pine counties had actual growth rates in income less than expected growth rates in income. Also for Churchill, Pershing, and White Pine counties the county differential growth rates were negative. For Churchill and Pershing counties the negative county differential growth rate in income can be attributed to the current agricultural financial crisis. The largest differential growth rate in income occurred in Lincoln County and is attributable to expansions at the Atomic Test Site.

From Table 8, only White Pine County realized an actual growth rate less than the expected growth rate in employment. Again differences in Tables 7 and 8 are attributable to characteristics of employment data where income data shows the effects of changes in economic sector activity more rapidly than employment. As with Table 7, Lincoln County in Table 8 showed the largest differential growth rate in employment of all counties in Nevada.

As noted earlier, differential growth rates are very useful for cross-county comparison. For example, income in Carson City, based on national sectoral behavior and the initial industry composition of Carson City, was expected to grow

by 8 percent, but actually grew by approximately 21 percent. The County Differential Growth Rate is 13 percent. This differential means that income in Carson City increased approximately 13 percentage points more than the national trend. To complete detailed county analysis, computations of income and employment growth rates for specific economic sectors are required.

Economic Sectoral Growth Components

Tables 9 and 10 show the Sectoral Differential Growth Rate for the state of Nevada and each county in Nevada for income and employment, respectively. Because of disclosure problems in some of the rural counties, economic sectors were combined in deriving Sectoral Differential Growth Rate. From Tables 9 and 10, the metropolitan counties of Clark and Washoe experienced relatively balanced rates of growth over all economic sectors. As for employment, the service sector (which includes the casino gaming industry) for both Clark and Washoe counties had the largest sectoral differential growth rate. However for income, the State and Local Government Sector and the Retail Trade Sector had the largest sectoral differential growth rates in Clark County, while the Manufacturing Sector and the Retail Trade Sector had the largest sectoral differential growth rates in Washoe County.

Table 7
Relative Income Growth Rate Components for the State of Nevada and Nevada Counties, 1977-1984

	County	Actual Growth Rate	Expected Growth Rate	County Differential Growth Rate
			(percentages)	
1)	Carson City	20.72	8.00	12.74
2)	Churchill	1.64	4.00	-2.32
3)	Clark	26.65	15.59	11.05
4)	Douglas	28.71	21.52	7.20
5)	Elko	34.55	11.83	22.72
6)	Esmeralda	135.30	5.70	130.00
7)	Eureka	81.25	10.15	71.10
8)	Humboldt	29.47	6.75	22.71
9)	Lander	36.57	9.25	27.32
10)	Lincoln	158.00	6.15	151.81
11)	Lyon	11.81	8.81	3.00
12)	Mineral	5.60	4.73	0.87
13)	Nye	76.60	25.43	51.17
14)	Pershing	-3.79	2.41	-6.20
15)	Storey	66.12	4.13	62.00
16)	Washoe	19.00	12.62	6.35
17)	White Pine	-20.80	8.16	-29.00
	State	25.03	14.23	10.80

Table 8
Relative Employment Growth Rate Components for the State of Nevada and Nevada Counties, 1977-1984

	County	Actual Growth Rate	Expected Growth Rate	County Differential Growth Rate
			(percentages)	
1)	Carson City	57.46	15.45	42.01
2)	Churchill	31.35	14.60	16.74
3)	Clark	54.90	24.14	30.75
4)	Douglas	66.29	30.06	36.23
5)	Elko	68.10	20.58	47.52
6)	Esmeralda	76.39	12.00	64.43
7)	Eureka	83.68	39.82	43.86
8)	Humboldt	62.27	17.74	44.53
9)	Lander	55.90	35.66	20.24
10)	Lincoln	115.81	17.84	98.00
11)	Lyon	92.71	16.59	76.12
12)	Mineral	27.90	14.37	13.53
13)	Nye	90.77	33.66	57.11
14)	Pershing	48.50	14.00	34.51
15)	Storey	103.00	15.34	87.66
16)	Washoe	48.11	22.65	25.46
17)	White Pine	3.03	25.12	--
				22.09
	State	53.87	23.47	30.40

However, when investigating the Sectoral Differential Growth Rates for both income and employment in the rural counties, growth across economic sectors was not balanced, suggesting that these counties should attempt to diversify their economies. In Lincoln County the combined economic sectors of Agricultural Services; Construction; Manufacturing; Wholesale Trade; Finance, Insurance, and Real Estate; and Services experienced a Sectoral Differential Growth Rate increase in income and employment of 164.24 percent and 108.73 percent, respectively, while the Mining Sector experienced a decrease in income and employment of 17.12 percent and 17.87 percent, respectively. Increased Service Sector activity can be attributed to the Atomic Test Site, while decline in the Mining Sector reflects the closure of the Union Carbide operation in Caliente.

Mineral County was one of the four counties that experienced a negative County Differential Growth Rate in income from 1977 to 1984. The primary reason for this less than expected performance is the transference of the Army Ammunition Plant in Hawthorne from a military to a civilian operation and its subsequent decrease in scale. This change would account for the large increase in the Sectoral County Differential Growth Rate for both income and employment in the Service Sector and the decrease in Sec-

Table 9

Sectoral Income County Differential Growth Rates for the State of Nevada and Nevada Counties, 1977-1984

County	Economic Sectors																					
	Farm	Farm, Ag Sv Mining, Mft Const, Fire TPU	Ag Serv.	Ag Sv, Mining	Ag Sv, Wt Mining, Sv Const, Mft, Fire, TPU	Ag Sv, Fire, Const, Mft, Wt	Const, Sv, Ag Sv, Wt, Mft, Fire	Mining, Mining TPU	Ag Sv, Wt, Const.	FIRE, Wt, Ag Sv, TPU	Mining, Sv.	Const.	MFT	TPU	WT	RT	FIRE	SV	Federal	St. & Local	County Differential Growth Rate
								(%)	-	-	-	-				-	-	-	-	-	-
Carson	-0.02		-0.09					-0.13				-2.19	13.18	0.23	1.13	2.58	-0.94	-1.51	-1.12	1.62	12.74
Churchill	-11.10		0.12						1.30			3.36	1.54		0.22	0.20	-2.82	1.11	2.29	1.44	-2.34
Clark	0.06			-0.808								0.87	0.92	1.72	1.18	1.93	0.87	0.03	0.84	2.64	11.042
Douglas	-0.09			0.460								-1.33	7.13	0.45	0.11	1.12	-0.66	-2.03	0.27	1.76	7.19
Elko	1.02		-0.20					10.51				1.96	0.93	1.31	1.04	-1.27	-3.50	8.20	1.27	1.46	22.72
Esmeralda	28.71				92.84											1.12			-0.05	6.98	129.60
Eureka	7.33				59.03							-0.18		2.86		-1.98			0.34	3.39	71.11
Humboldt	-1.21			13.180								15.16	-1.97	3.67	-2.96	0.71	-0.77	-5.73	0.55	2.09	22.72
Lander	4.91					-0.49		23.04						0.32		-3.88		1.56	1.16	0.70	27.32
Lincoln	9.61						164.24	-17.12						-1.32		-3.79			0.17	-0.01	151.82
Lyon	-3.65		0.62								-19.55	4.16	8.66	3.07	3.61	1.39	0.17		0.03	4.49	3.00
Mineral	0.04				60.10											-2.84			-41.20	-1.13	0.87
Nye	0.88							13.41		1.99		0.52	0.75			1.03		30.35	0.26	1.96	51.17
Pershing	-10.68				5.42											-5.59			0.03	4.61	6.21
Storey		63.92														-6.16	-1.05	3.53	-3.71	4.42	62.00
Washoe	0.05		0.28					-0.08				-4.15	2.60	1.82	0.62	2.17	-1.12	2.10	0.32	1.73	6.34
White Pine	1.00							-13.18	1.95				-11.57	1.82		-1.66	-0.78	-3.20	-0.08	-3.25	-28.95
State	-0.04	0.39	0.09	0.800	6.58	1.49	4.25	0.71	2.33	0.43	2.60	2.58	-0.55	1.95	1.62	0.89	1.73	-0.003	1.87	0.32	2.19	10.78

For Clark, Douglas, and Humboldt Counties, Ag Services and Mining Sectors were combined due to disclosure problems.

For Churchill County, the Mining and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Eureka, Esmeralda, Mineral, and Pershing Counties, the Ag Services, Wholesale Trade, Mining, Manufacturing, FIRE, and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Lander County, the Ag. Service, FIRE, Construction, Manufacturing, and Wholesale Trade Sectors were combined due to disclosure problems.

For Lincoln County, the Construction, Service, Ag Service, Wholesale Trade, Manufacturing, and FIRE Sectors were combined due to disclosure problems.

For Lyon County, the Mining and Service Sectors were combined due to disclosure problems.

For Nye County, the FIRE, Wholesale Trade, Ag Services, and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Storey County, the Farm, Ag Services, Manufacturing, Construction, Fire, and Transportation and Public Utilities were combined due to disclosure problems.

For White Pine County, the Ag Services, Wholesale Trade, and Construction Sectors were combined due to disclosure problems.

State Sectoral Income Differentials were derived for single and combined economic sectors.

Table 10

Sectoral Employment County Differential Growth Rates for the State of Nevada and Nevada Counties, 1977-1984

County	Economic Sectors																				
	Farm	Farm, Ag Sv Mining, Mft Const, Fire TPU	Ag Serv.	Ag Sv, Mining	Ag Sv, Wt Mining, Sv Const, Mft, Fire, TPU	Ag Sv, Fire, Const, Mft, Wt	Const, Sv, Ag Sv, Wt, Mft, Fire	Mining	Mining, TPU.	Ag Sv, Wt, Const	FIRE Wt, Ag Sv, TPU	Mining Sv,	Const	Mft	TPU	WT	RT	FIRE	SV	FED.	St. & Local	County Differential Growth Rate
								(%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carson	0.05		0.48					0.19					0.082	14.66	0.69	1.36	8.68	5.11	11.00	-0.93	0.71	42.01
Churchill	6.50		1.20						-20.63				4.410	3.11		-0.49	8.36	3.66	12.03	-1.42	0.01	16.74
Clark	0.06			0.63									1.760	1.33	1.60	1.44	5.21	5.80	9.58	1.06	4.04	30.75
Douglas	0.33			16.36									1.150	6.55	0.74	0.09	5.37	8.57	-4.91	0.31	1.47	36.03
Elko	2.07		0.54					5.28					3.550	1.61	1.84	1.85	0.59	3.33	24.43	1.44	1.00	47.53
Esmeralda	8.74				40.00												8.49			-0.19	7.41	64.45
Eureka	17.26				13.25												6.10			0.51	6.77	43.86
Humboldt	2.38			6.00									9.150	-2.47	3.24	-1.30	9.92	1.92	11.94	0.78	3.90	44.56
Lander	2.54					2.93		-11.93							4.95		2.83		15.29	0.28	3.35	20.24
Lincoln	4.07						108.73	-17.87							-1.84		3.60			1.05	0.23	97.97
Lyon	9.75		2.75									2.26	11.6000	14.79	4.09	5.15	11.23	9.16		0.50	4.72	76.00
Mineral	0.61				50.38												0.69			37.04	-1.11	13.53
Nye	1.75				17.34			5.08			4.06		1.460	0.82			6.35		33.84	0.37	3.40	57.13
Pershing	7.30																4.12			-0.85	5.87	34.50
Storey		36.40															12.77		32.08	-2.09	8.49	87.65
Washoe	0.18		0.48					-0.13					-2.010	1.84	1.74	0.50	5.58	4.34	11.07	0.36	1.52	25.47
White Pine	1.81							-18.89		4.41				-7.29	-1.22		0.37	0.36	2.90	0.07	-4.61	-22.80
State	0.48	12.22	0.56	0.50	22.16	9.78	20.65	-0.06	1.51	2.89	8.38	10.81	0.830	2.14	1.57	1.05	5.44	5.20	10.87	0.43	1.90	30.48

For Clark, Douglas, and Humboldt Counties, the Ag Services and Mining Sectors were combined due to disclosure problems.

For Churchill County, the Mining and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Eureka, Esmeralda, Mineral, and Pershing Counties, the Ag Services, Wholesale Trade, Mining, Manufacturing, FIRE, and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Lander County, the Ag. Services, FIRE, Construction, Manufacturing, and Wholesale Trade Sectors were combined due to disclosure problems.

For Lincoln County, the Construction, Service, Ag Services, Wholesale Trade, Manufacturing, and FIRE Sectors were combined due to disclosure problems.

For Lyon County, the Mining and Service Sectors were combined due to disclosure problems.

For Nye County, the FIRE, Wholesale Trade, Ag Services, and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For Storey County, the Farm, Ag. Services, Mining, Manufacturing, Construction, FIRE, and Transportation & Public Utilities Sectors were combined due to disclosure problems.

For White Pine County, the Ag Services, Wholesale Trade, and Construction Sectors were combined due to disclosure problems.

State Sectoral Employment Differentials were derived for single and combined economic sectors.

toral County Differential Growth Rate for the Federal Government Sector.

As for Churchill and Pershing Counties, the negative income Sectoral County Differential Growth Rate (Table 9) for the Agricultural Sector reflects the current financial crisis in agriculture. Also for Pershing County the decrease in Sectoral County Differential Growth Rate in the Retail Sector may be attributable to the recent Interstate Highway 80 overpass built around the community of Lovelock.

Conclusions

The results of the shift-share analysis are preliminary in the sense that the question of why a region has a positive or negative growth differential rate for any particular economic sector and whether or not there is a possibility that any industry can be located or expanded in a given county is not answered. This analysis only measures economic change in a county relative to a reference region, based on historical data. Further studies to determine the factors influencing positive or negative Sectoral Differential Growth Rates needs to be conducted. In the case of industries in which a region may have negative Sectoral Differential Growth Rates, Shaffer et al. (1976) point out that factors such as obsolete equipment and technology, poor transportation facilities, poor management practices, low labor productivity, geographical shifts of markets, and inadequate financial funds availability must be investigated to see if there is a possibility of remedying the situation. In the case of attracting new types of industries and expanding existing ones for which a positive Sectoral Differential Growth Rate exists, questions such as the availability of human and natural resources and infrastructures, as well as accessibility to markets must be answered to determine whether such expansion or location is economically feasible.

Results of the shift-share analysis showed that Nevada's economy grew faster than the national economy. Results also showed that different county results may be derived by using either income or employment data. Employment data which is generally used in shift-share analysis may not show changes in county economic activity as rapidly as income data.

The shift-share results for the metropolitan counties of Clark and Washoe indicate somewhat balanced growth among economic sectors. As for employment, the Service Sector experienced the largest differential growth rate in Clark and Washoe counties, which is due to the gaming casino industry being part of the Service Sector. As for the rural counties, the shift-share analysis depicted uneven economic growth between economic sectors. The results showed that for many rural economies in Nevada one economic sector has considerable influence on the County Differential Growth Rate. This emphasizes programs which encourage economic diversification in rural Nevada so that economic growth can become more balanced.

Selected Bibliography:

Andrikopoulos, A.A. "Regional Growth Differentials in Manufacturing Employment: The Case of the Province of Ontario, Canada." *Review of Regional Studies* 7(1977): 45-61.

Curtis, W.C. "Shift-Share Analysis as a Technique in Rural Development Research." *American Journal of Agricultural Economics* 54(1972): 267-270.

Dunn, E.S. "A Statistical and Analytical Technique for Regional Analysis." *Papers and Proceedings of the Regional Science Association* 5(1960):97-112.

Kalbacher, J.Z. "Shift-Share Analysis: A Modified Approach." *Agricultural Economics Research* 31(1979):12-25.

Malizia, E. "Standardized Share Analysis." *Journal of Regional Science* 18(1978):283-292.

Nevada Employment Security Department. *Nevada Occupational Projections 1984-1990.* Division of Employment Security Research, Carson City, Nevada, 1986.

Petrulis, M.F. "Regional Manufacturing Employment Growth Patterns." Rural Development Research Report No. 13, Economic Development Division; Economics, Statistics and Cooperative Services, U.S. Department of Agriculture, Washington, D.C., 1979.

Rones, P.L. "An Analysis of Regional Employment Growth, 1973-1985." *Monthly Labor Review* 109 (1986):3-14.

Shaffer, R., B. Manguish, and R. Dunford. *Changes in Wisconsin's Nonfarm Private Employment 1962-1972: A Shift and Share Analysis.* University of Wisconsin-Madison, Research Bulletin R2806, 1976.

U.S. Department of Commerce. *Local Area Personal Income: 1977-1982. Far West Region.* Bureau of Economic Analysis, Washington, D.C., 1984.

U.S. Department of Commerce. *Local Area Personal Income: 1979-1984. Far West Region.* Bureau of Economic Analysis, Washington, D.C., 1986.

U.S. Department of Commerce. *Regional Economic Information System.* Bureau of Economic Analysis, Washington, D.C., 1986.

Weber, B.A., M.V. Lebedoer, and R.A. Oliveira. "Changes in the Sectoral Income Structure of Oregon Counties: 1973-1978." Unpublished paper, Oregon State University, Corvallis, Oregon, 1984.

Footnote:

1. Detailed mathematical presentations of shift-share analysis are presented by Shaffer, et al. (1976), Weber, et al. (1984), and Malizia (1978). The three components of shift-share analysis are defined below as:

$$E^{t+1} - E^{t} =$$

$$E^{t}((E^{t+1}_{us} / E^{t}_{us}) - 1) \qquad \text{(Standard Growth)}$$

$$+ \sum_{i=1}^{n} E^{t}_{i}((E^{t+1}_{ius} / E^{t}_{ius}) - (E^{t+1}_{us} / E^{t}_{us})) \qquad \text{(Industrial Mix Growth)}$$

$$+ \sum_{i=1}^{n} E^{t}_{i}((E^{t+1}_{i} / E^{t}_{i}) - (E^{t+1}_{ius} / E^{t}_{ius})) \qquad \text{(County Share Growth)}$$

Where: E is total county employment (income); E_i is county employment (income in industry i; E_{us} is total national employment (income); E_{ius} is national employment (income) in industry i; and T and t + 1 is the base and target years, respectively.

Aspects of American Economic Renewal

*by Terence A. Brady**

I. Background

The history of the world economy since 1970 has been one of tumultuous change. For many years the major western capitalist nations were continuously battered by competition from Japan, South Korea, and other Pacific Basin countries, by competition from newly industrialized Third World nations, by several oil shocks, and by damaging inflation. The unemployment rate for OECD Europe as a whole was 11 percent in 1986 (OECD *Economic Outlook*, Dec. 1986, p. 27). There are now 31 million jobless in the OECD countries, an unprecedented level (ibid., p. 26). Unemployment rates in many of the smaller European nations compare with those of the 1930s. Unemployment in Spain is 21 percent; Ireland, 18 percent; the Netherlands, 13 percent (ibid., p. 29).

In the U.S. however, a process of renewal has taken hold in the 1980s. Very important changes have been made in a number of key areas: manufacturing has begun to redeploy resources into more promising areas, e.g., technology based activities; the auto industry has been forced to reorganize and alter its strategy. While Europe still suffers with double-digit unemployment, the U.S. has been adding jobs at a respectable rate.

This aspect of renewal, the job creation process, has begun to generate scholarly interest[1] and to attract the attention of the media. A *New York Times* article is typical. Between 1980 and 1986, over 9 million jobs were added to the American economy.[2] "That is a 10.1 percent increase, representing some of the fastest job growth since the bureau [U.S. Bureau of Labor Statistics] began doing the survey in 1919."[3]

This article is concerned with the job-creation aspect of renewal. While Europe has not been able to add any employment beyond its 1974 totals,[4] the U.S. has added millions of new jobs. In fact U.S. employment growth in the first half of the 1980s is actually twice as fast as that of Japan (see Table 5). In the context of America's own record, job growth of the 1980-85 period is very close to the robust job growth of the 1960s when Viet Nam expenditures fueled the economy (U.S. Department of Labor, *Employment and Earnings*, selected years, author's calculations).

Looking more closely at renewal, 94 percent of the 9 million jobs created in the U.S. since 1980 have been in services (*Employment and Earnings*, May 1986). The service sector contains many of the most dynamic activities in the economy: tourism, cable television, computer services, and telecommunications.

Walt Rostow, Mancur Olsen, and a number of well known writers have explored the shift of economic activity from the north to the Sunbelt (Rostow, 1977, and Olsen, 1982). The second variable in the current revitalization is the Sunbelt. The 9 million jobs added to the economy since 1980 can be traced to their source.[5] Labor Department data on states and areas clearly indicate that 71 percent of these jobs have opened in the South and West.[6] (In reference to our use of the terms *South* and *West:* The Bureau of Economic Analysis, Regional Economic Measurement Division, groups states into broad categories. *South* refers to their "Southeast" (Florida, Georgia, etc.) and *West* refers to their "Southwest," "Rocky Mountain" and "West" (West Coast). See B.E.A. *Local Area Personal Income*, 1979-84.

This intersection of *services* and *Sunbelt*, the dynamic elements in the economy, is a natural starting point for an inquiry into job growth and renewal. Here an inquiry however meets with its first obstacle: very little is known about the service economy in the Sunbelt. It is very understandable why this dark area in the literature exists. It would appear that whenever the Sunbelt phenomenon is discussed (especially in contrast with the problem areas in the industrial north (the "Rustbelt")) it is automatically assumed that the issue is one of plants relocating to the South and West. Everything is cast in terms of manufacturing. It bears repeating, however, that in recent years almost all newly created jobs are in services, 94 percent during the 1980s.

At the risk of oversimplification, it can be said that the goods-producing industries constitute the older, less dynamic sector of the economy. The northern tier states are the older, less dynamic region. In fact the northern industrial tier has lost over 3 million manufacturing jobs in the last 12 years. One aspect of renewal has been a redirection of the nation's economic energies into new industries and new regions. The service sector is the source of most job growth; the Sunbelt is the younger, more dynamic region.

The objective of this article is to explore the regional-industrial transformation, to better understand the refocusing of economic resources into services and the Southern kim. Section II provides background on some of the serious problems in manufacturing and in the manufacturing belt that preceded the revival of the 1980s.

Section III examines the employment gains of the 1980s, the dramatic job growth in services. It goes beyond the employment data and draws on a number of sources to ascertain which service activities are the most dynamic and prominent at the national level.

Section IV deals with the emerging service economy in the Sunbelt. Over 1 million jobs have opened in Florida alone

* Terence A. Brady, Ph.D., is Assistant Professor of Economics at St. John's University, Queens, New York.

over the last five years. Little is known about this growth.

The last section (Summary and Conclusion) achieves perspective by drawing together the main findings of the study.

II. Crisis and Renewal

The original economic malaise[7] was in part a result of the fact that some of the most important industries in the nation were losing badly in the arena of international competition. As recently as 1960, the U.S. produced roughly 50 percent of the world's cars; by 1982 the U.S. share of world auto production was only 19 percent. Japan's share rose from 3 percent to 30 percent (Scott and Lodge, 1985, p. 192). Output in the auto industry (gross product in constant dollars) actually fell by 1.9 percent annually between 1974 and 1982 (*U.S. Industrial Outlook 1984,* p. 31). Chrysler came very close to bankruptcy.

The output of primary metals fell by 7 percent annually over the same period (ibid., p. 31). Consumer appliances, apparel, and most of the manufacturing sector was stagnant. Of the twenty-one industries that comprise the manufacturing sector in the U.S., the majority grew at less than 1 percent annually over the 1973-1981 period (*U.S. Industrial Outlook 1983,* p. xxi).

The Lakes Region,[8] center of the auto-steel complex of activities, lost 1.2 million manufacturing jobs between 1970 and 1983.[9] The second highly industrialized area, the Mid-Atlantic states, lost over 1 million jobs during the same period (ibid.). New England, the oldest of the industrial zones, lost 1.4 million jobs as a direct result of plant closings (Bluestone and Harrison, 1982).

At the time this seemed very ominous. It was known that other western capitalist countries could not compete and it was not clear what was in store for the U.S. In Great Britain, industrial production fell by 2.2 percent annually between 1973 and 1980 (Lawrence, 1983). Most of Europe was struggling with strong Asian Pacific competitors (Japan, Korea, Taiwan) and trying to adjust to import competition. Unemployment rates were as high as 15-20 percent in some European countries (OECD, 1984). The new competition originated in several areas. Reynolds emphasized the newly acquired competitive strength in the Third World. He found that twelve Third World nations have recently emerged with 20-30 percent of GNP derived from manufacturing, which approaches the proportions in the "industrialized nations." Reynolds (1983) and Scott and Lodge (1985) emphasize the competitive prowess of Japan and the Asian Pacific countries.

It is unlikely that the U.S. will soon regain its preeminence in autos, steel, and other basic activities. It bears repeating that in 1960 the U.S. produced 50 percent of the world's cars; in the early postwar years it completely dominated the world's steel, television, and other key industries. A phase or chapter in American economic history is coming to a close. This phase centered around a number of key activities that have since lost much of their dynamism:

- The auto-rubber-steel complex; the oil and gasoline industries
- Construction: the 42,500-mile U.S. Interstate Highway system
- The postwar suburban construction boom
- The military-industrial complex and the Korean and Viet Nam Wars
- Domestic spending associated with the Johnson Administration "War on Poverty"

This industrial order was evident in the fact that the goods-producing sectors of the economy (manufacturing, mining, construction, and agriculture) accounted for 41 percent of GNP in 1955. By 1985, this sector made up 32 percent of GNP (*Survey of Current Business,* April 1986, pp. 24, 25).

The demise of the older order was reflected in the national debate on industrial policy. *Business Week* ran articles on the Asian Pacific Competitors and the effects of imports on the U.S. industrial belt, and eventually they produced a book entitled *Reindustrialization of America.*[10] An argument was made to the effect that if market forces were allowed to run their course unhindered, the northern manufacturing tier would deteriorate still further. In this view, a conscious policy was needed to counter market forces and to rebuild the stricken industries and the northern industrial tier. Since then the industrial policy issue has all but faded in the face of a well-publicized economic revival.

III. Services, the Consumer Society, and U.S. Economic Renewal

Data on the U.S. service sector is not as comprehensive as it could be, but we can draw on a mix of sources to piece together a picture of what is important. The numbers detailing the rapid job growth of the 1980s show that the subgroup consumer services accounts for roughly 4.5 million of the jobs added to the U.S. economy in the 1980s (*Employment and Earnings,* May 1986; April 1981).

The *hotel industry* is by far the area of fastest job growth here, and related leisure activities such as eating and drinking places are also growing rapidly. Hotels and tourism are an important part of the new economy. Huge conglomerates such as ITT, W.R. Grace and Co., and others have been diversifying into consumer services. Annual expenditures on travel and tourism in the U.S. amounted to $242 billion in 1985 (*U.S. Industrial Outlook 1986,* p. 61-1). The Hilton Hotel chain, Holiday Inns, and Disney Enterprises are large Fortune Service 500 firms that typify these trends. Orlando's Epcot Center, Disney World, Miami Beach, Hollywood, and Las Vegas are popular tourist destinations.

Hotels, travel, Las Vegas, and the like are merely reflections of a much larger entity, the consumer society of the 1980s. The U.S., as a consumer society, is experiencing very rapid growth not only of tourism, but also of cable television, the recording industry, the film industry, professional sports, and parts of retailing such as video appliance stores. In 1982, annual receipts of the entertainment industries (television, radio, cable television, the film industry, and professional sports) were over 40 billion dollars.[11]

Approximately 2.6 million jobs were added to the U.S. economy during the 1980s in retail trade.[12] The $240 billion

spent on tourism undoubtedly promotes employment growth in boutiques, cafes, jewelry stores, etc. Fast food is also very dynamic.

Finally, health services are a rapidly growing output and employment category. Expenditures on health constitute over 10 percent of GNP (*U.S. Industrial Outlook 1986,* p. 54-1).

The consumer services sector outlined above (tourism, broadcasting and films, health), if aggregated, accounts for roughly 20 percent of GNP.[13] The sector is a large contributor to U.S. job gains.

(While data are not available going back into the 1970s for certain detailed categories of consumer services, e.g., cable television, it can be shown that the consumer services sector has expanded its share of GNP from 13.9 percent in 1972 to 18 percent in 1985. Here we include tourist expenditures, network television and radio, motion pictures, and health services.)[14]

Intermediate Services. If we look at the 9 million jobs added to the U.S. economy in the 1980s, much of the increment is due to large increases in the intermediate sphere. Intermediate services — businesses that serve other businesses — have long been a familiar feature of capitalist production. Banking and credit, insurance, wholesaling, warehousing, and shipping were key activities in New York, London, and other great commercial centers in the last century. These cities were active in international commerce. In the postwar period, this sphere has expanded with the growth of corporate law and accounting firms, and business services (consulting, data processing, etc.). Contrasted with consumer services (e.g., tourism), these serve the needs of intermediate rather than final consumers. Intermediaries finance, coordinate, and facilitate production prior to final sales.[15] As a group, intermediate services have added 4.1 million jobs to the economy in the 1980s (*Employment and Earnings,* May 1986 and April 1981).

As we have said, consumer services constitute 20 percent of GNP. Services to business (intermediate services) make up another 36 percent (*Survey of Current Business,* March 1986, p. 94). To sum up, we can locate most of the job growth of the 1980s in these two areas, i.e., 4.5 million jobs attributable to consumer services, and 4.1 million attributable to intermediate services. Why these jobs are opening primarily in the Sunbelt is still to be resolved.

Table 1

Employment Growth in Intermediate Services 1980-86 (000's)

	1980	1986	Change (%)
Finance, insurance and real estate	5,061	6,118	21
Business services*	2,930	4,633	58
Legal, accounting and engineering	1,322	1,922	45
Transportation	5,130	5,280	03
Wholesale trade	5,250	5,864	12

*Business services consist of computer services, management consulting firms, personnel firms.

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings,* May 1986 and Jan. 1981.

IV. The Service Economy in the Sunbelt

Consumer services such as hotels and tourism are major contributors to employment gains at the national level; at the same time they are the backbone of many southern rim cities. Here we have to go beyond the employment data to achieve some understanding of what the Sunbelt economy is like. It has clearly played an important part in the current renewal.

Consumer Service Centers. The Federal Reserve Bank of Atlanta, in a recent survey of economic conditions in the Southeast, notes that 37.7 million out-of-state tourists visit Florida annually (Federal Reserve Bank of Atlanta, 1983). The available evidence suggests that Palm Beach, Fort Lauderdale, Miami, Miami Beach, and Tampa-St. Petersburg are the popular destinations. Even smaller population centers such as Orlando (1980 pop. 700,055) earn very substantial revenues from tourists. The hotel and amusement services in Orlando earn roughly $1 billion in annual receipts.

West Coast tourism may be even more substantial. San Diego and Tijuana are almost adjacent and both are major tourist centers; Hollywood and Beverly Hills draw large numbers of visitors. Disneyland is in Anaheim. Reno and Las Vegas are the two most important gambling resorts.

While it is common knowledge that Sunbelt areas such as Miami and Fort Lauderdale earn substantial revenues from tourism, it is not widely known just how important tourism has become in recent years: we find at least 10 metropolitan areas that are now heavily dependent on tourism and entertainment. Tourist revenues coupled with large federal government inflows act as an export base in the Sunbelt. Table 2 quantifies some of these revenue flows. Tourist and federal government revenues are aggregated and calculated as a percentage of total non-farm income.

The information in Table 2 is a rough measure of the importance of tourism in these areas, but tourist revenues are undoubtedly larger than the numbers indicate. It bears repeating that almost 38 million tourists visit the Florida coast annually; the table does not capture tourist expenditures going to retail trade (restaurants, bars, boutiques, jewelry stores, etc.). Nor does it include air transportation, car rental agencies, and the like which are very important in Miami and other areas. All of these flows are more difficult to measure.

The revenue flows in Table 2 are best understood in the context of the export base framework. Regional science has long been interested in how inter-urban revenue flows stimulate economic development and job creation.

A Framework for Regional Dynamics and Job Creation. Economic base theory[16] is the conceptual foundation of this article. Innis found, in studies of Canadian regional growth, that in many cases, one or two key industries (such as mining, petrochemicals, and timber) came to dominate a region. Growth in this basic sector generated growth in the region as a whole (Innis, 1962).

Table 2

Tourism and Entertainment as an Export Base: Annual Receipts of Hotels, Amusement and Recreation Establishments, 1982 (millions of dollars). Column II is personal income earned in the federal government sector, 1982.

	I	II	Revenues as a Share of Non-Farm Income (%)
Orlando (Disney World)	974	382	23
Miami	779	520	9
Fort Lauderdale	485	105	9
Tampa	574	461	10
San Antonio	340	1,561	23
San Diego	678	3,078	24
Anaheim (Disneyland)	912	503	8
Reno	892	69	46
Las Vegas	2,909	300	74
Los Angeles	8,266	2,139	13

Source: 1982 *Census of Service Industries,* Geographic Area Series (receipts). Columns II and III, Bureau of Economic Analysis, *Local Area Personal Income, 1979-83.*

Later work led to an urban version of the theory. The explanatory usefulness of the approach is obvious in the case of Detroit (autos), Pittsburgh (steel), Las Vegas and Miami Beach (tourism), and in many other cities. Early theory developed by such pioneer writers as Christaller and Losch, held that cities grew by trading with the immediate hinterland. Export base theory, however, by looking closely at cities like Detroit, emphasized that trade was inter-urban and often international. The economic base ties the city to the national economy. A contemporary researcher puts it this way:

> The growth of a city normally cannot be separated from the economic activities present in that place or from the inter-urban economic ties associated with those activities. Hence the population size and economic well being of a city does not depend merely on the provision of goods and services to smaller places in its retailing and agricultural hinterland as suggested by Classical Theory. (Christaller in Pred, 1982)

The essential insight of the economic base approach concerns the employment-creating potential of the basic industries. Here an increase in the external demand for the export generates rising output, income, and employment in the basic sector. These incomes are then spent locally, stimulating the so-called local sector (retailing, personal services, etc.). The theory "neatly points out the process whereby growth in one sector induces growth in another" (Isard).

The growth-promoting potential of manufactured exports has long been recognized, but it eventually became clear that services could also act as an economic base in practical effect. Services are not merely dry cleaners or auto repair. Las Vegas *tourism,* like autos in Detroit, draws revenues into a city from outside. These revenues are spent locally, inducing growth in the nonbasic sectors. Other service-sector activities (military bases, finance, e.g., capital flows) have an effect similar to exports on the balance of payments of a social unit.

Quantitative techniques have been developed to estimate employment in the basic sector. Having estimated basic employment, least squares regression can be used to examine a relationship between growth in basic employment, the explanatory variable, and growth in the rest of the city's economy, i.e., all nonbasic employment (McNulty, 1977).

Looking again at Table 2 from the perspective of export base theory, the large tourist revenues, coupled with billions of dollars of federal government inflows, act as an export base and undoubtedly stimulate local activities. These flows are over $10 billion in Los Angeles.

Not surprisingly, there is an impressive proliferation of local establishments (coffee shops, restaurants, etc.) in cities like Los Angeles.[17] There are over 71,000 retail and "selected service" establishments in the Los Angeles metropolitan area: cafes, restaurants, movie theatres, boutiques, beauty salons, fast food establishments, and the like.[18] There are over 30,000 of these in Miami; 50,000 in Dallas.

This process, whereby billions of dollars of basic revenues (tourism, government) stimulates the growth of local establishments, sheds light on why consumer services are such an important contributor to job growth in the Southern Rim areas and in the U.S. generally.

Without going into great detail it should be noted that the Sunbelt is also known for other consumer services such as retirement villages, condominiums, drive-in shopping malls, and health services. In San Antonio, health industries generate payrolls amounting to over $500 million annually (1982 *Census of Service Industries,* Geographic Area Series, Table 4A). The balance of evidence is that revenues are drawn into the area from outside as in the case of an export industry. The following institutions (in the San Antonio area) are representative of the kinds of service organizations that we have in mind (Gould, 1984).

1. School of Aerospace Medicine
2. Brook Army Medical Center
3. South Texas Medical Center—a 700 acre site containing five medical-nursing colleges and the University of Texas Health Science Center
4. Wilford Hall U.S. Air Force Medical Center
5. Academy of Health Sciences

This descriptive material is useful since it underscores the fact that services can be relatively advanced and knowledge-based; they often embody elements of high technology as is the case with aerospace medicine, bio-medical research, etc.

Diversified Intermediate Services. As a share of GNP, the various services to business are even more important than the consumer services. These serve the needs of intermediate rather than final consumers. This intermediate sphere (banking, wholesale trade, transportation, etc.) finances and coordinates production prior to final sales.

Atlanta's areas of specialization provide insights into this type of service city. Atlanta's employment in *wholesale trade* as a percentage of total SMSA employment is unusually high, in fact more than double the comparable figure for the U.S. economy. *Transportation* as a share of total Atlanta employment is also unusually high, roughly twice the U.S. figure. (To some extent the heavy concentration of employment in wholesaling and transportation reflect Atlanta's historical role as a regional transportation hub. Once a major rail center, more recently it has achieved status as an important center of air transportation.) Similarly, employment in other intermediate activities such as finance and business services (data processing) is well above normal if the U.S. economy is used as a benchmark. Atlanta

is a Federal Reserve district city.

One finding stands out: if aggregated, these intermediate services account for 32 percent of employment in the Atlanta SMSA. These same services are only 19 percent of total U.S. employment.

With this in mind, the percentage of total SMSA employment devoted to intermediate services is calculated for a subgroup of Sunbelt centers and is presented in Table 3. We show comparable figures for areas with a different industrial base, for purposes of comparison.

As the table indicates, these population centers are characterized by employment levels in the intermediate services that are well above the norm if the U.S. economy is used as a benchmark, where the share is 19 percent. In short, they are much more specialized in these services than the U.S., the usual benchmark.

These metropolitan areas are major producer service centers that meet the business needs of their respective regions. San Francisco, with large institutions like BankAmerica, Crocker National, Wells Fargo, meets West Coast banking needs. Dallas is the main money center in the Southwest. Houston is a key commercial center specializing in finance, wholesaling, port functions, etc. (Houston ranks 4 in the nation in volume of wholesale trade sales.)

With major commercial centers like San Francisco, Los Angeles, San Diego, and some of the largest banks in the world (BankAmerica), it is not surprising that intermediate services are a $70 billion annual business on the West Coast. This is an $85 billion industry in the Southeast. They are the largest contributors to recent employment gains in the Sunbelt.

Houston is an interesting example of a modern service economy. Once an industrial center of some importance, it has for many years experienced dramatic job losses in manufacturing. Over the last 5 years alone, the Houston metropolitan area lost over 70,000 manufacturing jobs. (*Employment and Earnings,* May 1986; April 1981). Manufacturing employment now contstitutes less than 12 percent of total employment in the Houston metropolitan area. Oil has lost much of its former prominence. In recent years, personal income earned in the oil industry has constituted less than 10 percent of total SMSA income (U.S. Dept of Commerce, *Local Area Personal Income,* 1979-84). Like many other American cities, Houston is shifting to services. High technology is an area of manufacturing that remains significant in this city.

Estimating The Impact of Basic Activities: Regression in an Export Base Framework

The economic base theory was discussed above, and it was noted that quantitative techniques have been developed specifically for this framework. We have used these techniques to search for factors fueling the growth of employment and income in a number of Sunbelt centers: Houston, San Antonio, Atlanta, and Miami.

Before reporting these results it might be helpful to note some of the criticisms leveled against the economic base framework, and some of its limitations. Criticisms of the theoretical claims can be distinguished from those raised against the techniques employed, e.g., least squares estimates of multipliers. In essence, the *theory* claims that a region's basic activities (autos in Detroit, tourism in Las Vegas) are a strategic factor in fueling overall regional growth. Some versions are more provocative and suggest that the base is the chief source of regional growth. Tiebout (1964) was one of the first to respond to this by arguing that there were actually a number of independent factors that could promote urban and regional growth; there was no reason to suspect that the export base was the sole or even the most important variable. In short, a very familiar criticism of the export base theory has been that it is a simplification that does not do justice to the complexity of regional development (Hoover, 1984; Maser, 1973). Allen Pred has explored the ways in which nonexport or "local" industries can expand autonomously (with no stimulus from the export sector) and thus fuel overall regional growth (Pred, 1982). The nonbasic sector of a city can expand simply through productivity gains.

While there is no denying that many other factors promote regional development, it would be a mistake to downplay exports and assume that they are just one of many miscellaneous influences. The importance of the economic base theory is its generality. Numerous detailed studies have shown that staples such as mining in the Yukon, fur, timber, and wheat in Canada, have encouraged growth in their respective regions. There have been studies of tourism in Hawaii and the Caribbean; studies of tropical exports (coffee, rice, etc.); studies of aerospace on the West Coast. Oil is undoubtedly a growth promoter for Persian Gulf regions and the small oil-exporting countries.

The *generality* of the economic base concept derives from the fact that regions and cities are not self-sufficient: they must import. Regions are able to pay for these imports with export-derived earnings. As Thompson has put it, both "Denver and Switzerland must export or die." They cannot continue without a regular flow of imports.

Criticisms have been directed at the technical aspects of the theory, e.g., accurately identifying the export sector so as to derive multipliers. In San Diego, for example, roughly $3 billion of federal money (largely military) flows into the city annually; thus the federal government can be assigned to the basic sector here. Similarly there is no confusion with hotels and tourism in cities like Las Vegas. These are clearly basic. On the other hand, an obvious problem arises with manufacturing, wholesaling, finance, and the like: not all manufacturing is export oriented. For small regions, a complete telephone or mail survey of firms can disclose the size of the export sector, especially if the area is dominated by several giant enterprises. When surveys are impractical, short-cuts can be used to approximate the size of the base (location quotients, absolute surplus workers, minimum requirements, etc.).

We have used the minimum-requirements technique developed by Ullman in 1960. This has been discussed and criticized in the literature (see for example the exchange between Pratt and Ullman in *Economic Geography*). While this is an area that still requires much more research—it must be recognized that these techniques are constantly being refined and modified—recent research suggests that minimum-requirements is much more reliable than location quotients and older methods. Gibson and Worden (1981) used a very expensive and time consuming survey (mail and telephone)

of public and private employers for small areas and arrived at very good measurements of the export sector for these areas. Using this as the ideal, they made similar estimates using short-cut techniques and found that minimum-requirements was far more reliable than the various forms of the location quotient.

In implementing the regression approach, the first step involves the use of estimating techniques to identify the area's basic sector in employment or personal income terms. In the case of Houston, Table 3 shows that the city is stongly oriented toward services to business (finance, data processing, etc.). Formal estimating techniques confirm that these are in fact basic activities in this area; several technology industries are also basic.

Table 3

SMSA's Specializing in Diversified Intermediate Services:* Total Employment in Intermediate Services (%)

I. Atlanta, Ga.	32	II. Allentown-Bethlehem, Pa.	16
Jacksonville, Fla	31	Flint, Mich.	14
Dallas, Tex.	28	Bridgeport, Conn.	19
Houston, Tex.	29	Detroit, Mich.	20
Phoenix, Ariz.	26	U.S.	19
Albuquerque, N. Mex.	29		
San Francisco, Calif.	32		

*Intermediate services are defined as finance, insurance, and real estate; business services; professional services (corporate law firms, accounting, etc.), and wholesaling and transportation.

Source: *1980 Census of Population,* Detailed Population Characterictics, Table 228.

Having identified the area's basic activities, the accepted practice, as noted earlier, is to use least squares regression to test the proposition that changes in basic employment explain changes in the rest of the area's economy, i.e., all nonbasic employment. In the case of Houston,[20] summary statistics provide evidence that growth industries (both services and high technology) are important explanatory variables in accounting for changes in employment. The coefficient is positive (1.36); the t statistic is 13.9, significant at the customary 5 percent level, and the $\bar{R}^2$ is .90. The D-W statistic is within the acceptable range given the 14 data points. (The period is 1970-83, the last year for which detailed statistics are available.) The employment multiplier (2.36) is similar to those estimated in earlier studies, as reported in the literature.[21] For every job created in the export sector, 2.36 jobs are created in the local or nonbasic sectors.

We used the same techniques[22] in case studies of other Sunbelt centers (San Antonio, Atlanta, Miami). It was found that in these areas, only services were significant in accounting for changes in employment and income. (*The Census of Manufacturing* and other evidence shows that high technology industries are not very well developed in these areas.)

Without going into great detail, it could be mentioned that two service categories, wholesale trade and federal government, were found to be the key explanatory variables in understanding Atlanta's recent growth. In this particular case study, done in 1986, a multiple regression was used and the variables were cast in personal income rather than employment terms. The dependent variable is annual change in nonbasic income, the independent variables are changes in income derived from wholesale trade (WHT) and federal government (FED). The results of a regression over the period 1971-83[23] are as follows:

Coefficients	t	$\bar{R}^2$	F	D-W
N = 12 WHT 2.7 (.83)	3.3	.94	91.2	2.50
FED 9.6 (1.6)	6.0			

Atlanta is a Federal Reserve city with a strong finance sector. There was weaker evidence that finance and other intermediate services were related to the dependent variable (positive coefficients but low t statistics when these were added as regressors).

V. Job Categories and Income

Twenty-four years ago, Jean Gottman predicted the national shift to services and argued that a major long term consequence would be a "White Collar Revolution," i.e., a dramatic expansion in highly skilled, white collar office personnel. The white collar class would be better educated and better paid than their blue collar counterparts in manufacturing and the sphere of material production (Gottman, 1961).

Table 4

Average Weekly Wages of Non-supervisory Workers by Industry (1985)

I. Services		II. Industry	
Hotels	$176	Mining	$517
Amusement	201	Construction	466
Motion Pictures	302	Manufacturing	382
Retail Trade	174		
Health	258		
Banking	245		
Business Services	242		
Legal	350		
Wholesale Trade	351		

Source: U.S. Bureau of Labor Statistics, *Employment and Earnings,* July 1986.

The shift to services has created new job categories and labor markets. Researching this area would be a large project in and of itself and clearly more research is needed here.[24] It would seem at this point, however, that what has occurred is very different from Gottman's scenario. The shift to services has created a very large mass of nonunion, low-wage jobs with wage rates well below manufacturing, construction, mining, and the other blue-collar categories. In finance, insurance, and real estate, 6 percent of the male work force and 2 percent of the female work force are unionized; in business services the figures are 11 percent and 7 percent; retailing, hotels, and personal services are also relatively unorganized. In sharp contrast, males in manufacturing and construction are 37 percent and 34 percent unionized respectively (all numbers on unionization are from *Statistical Abstract of the United States,* 1984, p. 441). It can easily be shown that hourly and average weekly wages of nonsupervisory employees in services are considerably lower than in manufacturing, construction, and mining. Wages in

the hotel industry, amusement industry, and personal services are the lowest in the service sector.

If one were to construct an imaginary road map of the U.S., one could visualize since 1970 a dramatic migration out of the highly unionized, high wage *regions* (e.g., the north central) into the nonunion "right to work" states where average wages are relatively lower. (Data on unionization by state are available and there are a number of areas in which only 10 percent of the workforce is organized).[25]

A second and related migration is from highly unionized *industries* (mass production manufacturing) to relatively unorganized industries (services).

Finally, it would appear that manpower and capital are being forced out of those activities that are increasingly exposed to foreign competition (cameras, textiles, shoes, steel); resources are taking refuge in activities where international competition is minimal-services such as hotels and tourism, eating and drinking places, fast food.

In short, services seem to be growing in part since there is a flight from unions, high wages, and foreign competition. At least from the perspective of management, services have a decided advantage in all three areas.

Summary and Conclusion

During the 1970s the western capitalist countries were hit by various external shocks, i.e., by strong competition from newly industrialized Third World nations, from Japan, and from the Pacific Basin, as well as several oil shocks. All of these factors combined to make this one of the most turbulent periods since the 1930s.

Like Europe, Canada, and other OECD countries, the U.S. went through a difficult period of change. But by 1986 it was clear that the U.S. was adjusting; parts of the economy were being reorganized and there were signs of revitalization and renewal in a number of areas.

In sharp contrast, Europe as a whole has not been able to add any new employment in over 10 years. Table 5 highlights recent developments.

Table 5

Job Growth in Major OECD Countries, 1980: Fourth Quarter, 1985 (millions)

	1980	1985	Change (%)
Germany	25,925	25,252	--
Britain	24,494	24,278	—
France	21,252	20,946	—
Italy	20,558	20,664	+ .005
Spain	11,254	10,623	—
Japan	55,463	58,030	+ 4
U.S.	99,808	108,258	+ 8

Source: *Quarterly Labor Force Statistics, November 3, 1986.* Paris: OECD, 1986.

A fruitful insight into these developments is that job gains in the U.S. are almost entirely in services and mainly in the Sunbelt economy. Renewal involves a reorienting of economic energies into new industries and new regions. The objective of this article was to explore this process, to better understand the redeployment of resources into services and into the South and West. This paper focused on the fact that 9 million new jobs have been added to the economy in the 1980-86 period, an increase of roughly 10 percent.

It is very helpful to look back and learn from earlier parallels since there is much groping in the dark in exploratory work of this kind. In the late 1800s, young industries such as oil, steel, and meat-packing initiated a wave of expansion across the Northern Tier (oil in Cleveland; meat-packing in Chicago; steel in Pittsburgh). With the benefit of hindsight these patterns are easily recognized; the more difficult task is to outline the pattern now unfolding in the case of services and the Southern Rim.

An examination of employment statistics reveals that national job gains in the 1980-86 period concentrated mainly in two areas: *consumer services* (especially leisure activities) and *services to business*. More important, national accounts data reveal that these form an increasingly significant share of GNP. The service sector as a whole constitutes 68 percent of GNP.

Consumer services such as tourism, television and film industries, and Las Vegas-type entertainment had been important basic activities in several Sunbelt areas for some time; we now find that consumer services are key basic functions in at least ten large Sunbelt population centers (Orlando's Epcot Center and Disney World; Los Angeles television and film industries; San Antonio's tourism and medical services; Miami's hotel industry and airlines). These cities are also sustained by very large federal government inflows.

A second group of cities specializes in services to business. These centers include major banking nodes: San Francisco, Dallas, Houston, Atlanta, and Jacksonville. With giant institutions like BankAmerica, Wells Fargo, and others (San Francisco) the intermediate services, i.e., services to producers, are a $70 billion annual business on the West Coast. This reflects the maturing of the Sunbelt, historically the less developed part of the country, dependent on northern money centers.

Export base theory is used to understand how basic revenue flows (e.g., tourism and federal government inflows) contribute to development and job creation. Common sense would suggest that $10 billion in annual revenues (as in the case of Los Angeles tourism and entertainment) will induce growth in the local sector, e.g., restaurants, cafes, retail trade. We present several kinds of evidence to illustrate this concept.

Results of the author's export base studies are presented for San Antonio, Atlanta, Houston, and Miami. Regression is used in an export base framework to show how changes in basic activity (e.g., tourism) induce changes in the local sector.

Both types of cities studied (consumer and producer service centers) thrive in part since they are shielded from Asian Pacific competitors. Northern cities producing steel, autos, cameras, apparel, and other manufactured commodities are much more exposed to the winds of global competition.

England, the Benelux countries, and much of Europe suffer from double-digit unemployment. They have not been able to develop their consumer service sector to the degree seen in the U.S. Los Angeles earns over $10 billion from entertainment and tourism. Florida, with its 40 million annual tourists, has added over 1 million jobs since 1980.

Looking to the future it seems clear that the economies

that persevere will be those that can innovate. As textiles, steel, and cameras fade, new industries take their place. The U.S. has innovated by expanding and developing its service sector to a point well beyond that of most other countries.[26] This is innovation: the development of new tourist industries, television and film, new financial and computer services.

Footnotes:

1. The question as to why the U.S. has been relatively more successful than Europe in creating jobs is addressed in R. D. Norton, "Industrial Policy and American Renewal" (*Journal of Economic Literature*, March 1986). It should also be mentioned that a new journal was launched in January 1987, devoted specifically to renewal topics: *Economic Development Quarterly: The Journal of American Economic Revitalization.*
2. Between the third quarter of 1982 and the third quarter of 1985, real GNP in the U.S. grew at an annual rate of 4.3 percent (U.S. Department of Commerce *Survey of Current Business*, January 1986, p. 2).
3. *New York Times*, June 8, 1986, p. 1. The U.S. Bureau of Labor Statistics, *Employment and Earnings*, can also be used to compare job growth in the 1980-86 period, with earlier performance.
4. *Labor Force Statistics 1964-84*, (Paris: OECD, 1986, p. 25) and for 1985 employment, OECD *Economic Outlook* (December 1986, p. 26).
5. To be precise, Labor Department data do show where the new jobs have been created on a state by state basis; establishment data however leave out military employment, proprietors, and the self-employed.
6. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (April 1986) and *Supplement to Employment and Earnings Data for 1977-81* (September 1982). (Author's Calculations.)
7. Here we have in mind the 1970s, when the economy was hit hard by foreign competition (the Chrysler bailout and the manufacturing crisis in general) and debilitating stagflation.
8. The Bureau of Economic Analysis, Regional Economic Measurement Division defines the *Lakes Region* to include Michigan, Illinois, Ohio, Wisconsin and Indiana. See *Local Area Personal Income* 1979-84.
9. Calculated from U.S. Department of Commerce, *County Business Patterns*, 1970 and 1983.
10. Seymour Zucker et al. (The Business Week Team). *Reindustrialization of America*. New York: McGraw Hill, 1982.
11. Calculated from *U.S. Industrial Outlook 1983; 1982 Census of Service Industries.*
12. Calculated from *Employment and Earnings*, May 1986 and April 1981.
13. Health expenditures are 10.5 percent of GNP. (*U.S. Industrial Outlook*, 1986, p. 54-9). Tourist expenditures are roughly 8 percent of GNP (*U.S. Industrial Outlook*, 1986, p. 61-1). The film industry, professional sports, and broadcasting make up $33 billion of real GNP.
14. Figures for tourism and health are from *U.S. Industrial Outlook*, selected years. For television and entertainment, July 1973 *Survey of Current Business*, p. 11; and March 1986 *Survey of Current Business*, p. 94.
15. The large commercial banks (Citicorp, BankAmerica) are good examples of intermediate firms, but it should be noted that finance, insurance, and real estate to some degree provide services to final consumers as well.
16. See for example James McNulty, "A Test of the Time Dimension in Economic Base Analysis," *Land Economics* 53.3, August 1977; Curtis Braschler, "A Comparison of Least Squares Estimates of Regional Multipliers with Other Models," *Journal of Regional Science* #12, December 1972.
17. It is instructive to look at cities like Los Angeles since the commonly held impression is that tourism, entertainment, and the like, are familiar Sunbelt phenomena but the province of three or four well known resorts—Las Vegas, Miami Beach, Orlando. In fact the phenomenon is broader than this. "Resort" is much too narrow a conception for what is developing.
18. Calculated from 1982 *Census of Retail Trade* and 1982 *Census of Service Industries.*
19. Personal income earned in the intermediate services in the Far West region was $71 billion in 1982; $85 billion in the Southeast (*State Personal Income, 1929-82*, Bureau of Economic Analysis.)
20. Brady, T.A. "Industrial Re-structuring in the 1980's: A Note on the Houston Economy," *Journal of Business and Economic Perspectives*, forthcoming Spring 1987.
21. See for example, S. Weiss and E. Gooding, "Estimation of Differential Employment Multipliers in a Small Regional Economy." *Research Report of the Federal Reserve Bank of Boston*, Nov. 1966; and C. Braschler, "A Comparison of Least Squares Estimates of Regional Multipliers with other Models." *Journal of Regional Science*, Dec. 1972.
22. Brady, T.A. *The Service Economy in the Sunbelt*. Ph.D. dissertation, New School for Social Research, 1985.
23. These are the only years for which detailed numbers are available (gaps before 1971).
24. Several studies dealing with job categories and income associated with the growth in "advanced services" (corporate offices, data processing, corporate law, etc.) have emerged from Columbia University's Conservation of Human Resources Institute, which specializes in manpower and labor issues. See Stanbank, Noyelle, et al. (1981) and Noyelle (1983). This work, however, does not deal with consumer services such as tourism and hotels, fast food, and the like.
25. B. Harrison has developed this argument in *De-Industrialization of America*, New York Basic Books, 1982.
26. It is interesting that the intermediate services constitute roughly 29 percent of GNP in the U.S. but only 23 percent in Britain, 23 percent in France, and 18 percent in Germany. This reflects the expansion of the financial sector in the U.S. Here *intermediate* is defined as finance, insurance, real estate, business services, transportation, and storage. OECD accounts do not break out wholesaling as a separate category. (National Accounts, Paris: OECD, 1986).

References

Bluestone, Barry, and Harrison, Bennett. *The Deindustrialization of America*. New York: Basic Books, 1982

Gibson, L.J., and Worden, Marshall. "Estimating the Economic Base Multiplier: A Test of Alternative Procedures." *Economic Geography*, April 1981.

Gottman, Jean. *Megalopolis: The Urbanized Northeastern Seaboard of the U.S.* Cambridge: MIT Press, 1961.

Gould, Samuel. Director, Center for Studies in Business Economics and Human Resources, University of Texas at San Antonio (interviews).

Hoover, Edger. *Introduction to Regional Economics*. New York: Alfred Knopf, 1985, p. 319.

Innis, H.A. *The Fur Trade in Canada*. New Haven: Yale University Press, 1962.

_____ "Settlement and the Mining Frontier." In *Canadian Frontiers of Settlement*, Vol. IX. WA. MacIntosh, editor; London: Macmillan, 1937.

Lawrence, R.Z. "The Myth of U.S. De-industrialization." *Challenge*, Nov.-Dec. 1983.

Maser, Ian. *Analytical Models of Urban and Regional Planning*. London: Davis and Charles, 1972, p. 68.

Noyelle, Thierry. "Implications of Industry Restructuring for Spatial Organization in the U.S." In Frank Moulaert, editor, *Regional Analysis and The New International Division of Labor*. Boston: Kluwer-Nijhoff, 1983.

Olsen, Mancur. *The Rise and Decline of Nations: Economic Growth, Stagflation and Social Rigidities*. New Haven: Yale University Press, 1982.

Pratt, R. "An Appraisal of The Minimum Requirements Technique." *Economic Geography*, 44 1968, pp. 117-124.

Pred, Allen. *Urban Growth and City Systems in the U.S.* Cambridge: Harvard University Press, 1982.

Quarterly Labor Force Statistics. Paris: OECD, November 1984.

Reynolds, Lloyd. "The Spread of Economic Growth to the Third World." *Journal of Economic Literature*, September 1983.

Scott, Bruce, and Lodge, B. *U.S. Competitiveness in the World Economy*. Boston: Harvard University Press, 1982.

Stanback, Thomas. *Services: The New Economy*. Totowa, New Jersey: Allenheld Osmun, 1981.

Tiebout, Charles. "Exports and Regional Economic Growth." In John Friedman and William Alonso, editors. *Regional Development and Planning*. Cambridge: MIT Press, 1964.

Ullman, Edward. "Minimum Requirements After a Decade. A Critique and Appraisal." *Economic Geography*, Oct. 1968.

The Policy Implications of and Experience with, Preparer Penalties

by Edward J. Schnee, Kathleen J. Bindon, and Craig A. Ellis

Introduction

The philosophy behind the assessment of preparer penalties and the resulting burdens placed upon tax return preparers have been changed by the passage of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA). Currently, the role of the preparer frequently parallels that of an enforcement agent for the Internal Revenue Service (IRS) rather than an advocate for the client. This paper briefly describes the historical development of preparer penalty laws and presents the results and implications of a survey of tax return preparers and users of tax return preparation services. The survey was undertaken to determine anticipated response to the TEFRA penalty provisions, both by tax return preparers and users of tax return preparation services. Of particular interest are any changes either group plans to make.

History of Preparer Penalties

Criminal liability penalties may be imposed upon any preparer who willfully aids or assists in the preparation of any false or fradulent return, affidavit, or document (Sec. 7206). Prior to 1976, the IRS had limited ability to monitor and regulate tax return preparers because there were no effective civil penalties. In the case of criminal liability penalties, the burden of proof rested with the IRS. It became apparent that the threat of criminal prosecution was having limited effectiveness in insuring that preparers maintained high standards of practice. Recognizing the problem, Congress included a series of preparer penalties in the Tax Reform Act of 1976.

A preparer is defined as any person who prepares for compensation, or employs another person to prepare for compensation, either a substantial portion or all of a tax return or claim for refund [Sec. 7701(a)(36)]. The furnishing of typing, reproduction, or other mechanical assistance is not considered to be return preparation.

Section 6694 assesses preparer penalties if there is substantial understatement of net tax liability, either through understatement of the gross tax liability or overstatement of a refund. Two types of penalties are involved. Section 6694(a) imposes a $100 penalty on a preparer where the understatement results from negligence or intentional disregard of rules or regulations. A second penalty of $500 is imposed by Section 6694(b) for the willful attempt to understate a tax liability. In the event both penalties are applicable, the maximum total penalty will be $500 as the 6694(b) penalty is reduced to $400, by the negligence penalty of $100 [Sec. 6694(b)].

In order to assess the willful understatement penalty, the burden of proof is on the government to prove either that the preparer ignored information provided by the taxpayer or that the preparer ignored implications of information furnished by the taxpayer [Reg. Sec. 1.6694-1(b)(2)(i) and (ii)]. In the latter circumstance, the preparer is required to make reasonable inquiries where the information furnished appears either incorrect or incomplete.

The majority of penalties assessed under Section 6694 have been for negligence. For example, for the fiscal year 1979, negligence penalties were applied to slightly more than 2 out of every 1,000 returns examined, while willful understatement penalties were only applied to slightly more than 2 out of every 10,000 returns. A total of 14,589 Section 6694 penalties were recommended at examination for fiscal years 1977-1980. Of that total, 11,814 (81 percent) were negligence penalties, with the remaining 2,775 (19 percent) of the recommended penalties being for willful understatement (Kamerow, 1981). In many instances, the negligence penalty, rather than the willful understatement penalty, has been assessed when the preparer failed to consider the implication of information provided by the taxpayer. Apparently, the government was unwilling to bear the burden of proof necessary to assess the willful understatement penalty.

Negligence is not defined specifically in the code or regulations. However, in the case of *Marcello v. Commissioner*, [380, F.2d, 499(CA-5)], the Fifth Circuit Court of Appeals held that negligence is a lack of due care, which was defined as the failure to do what an ordinarily prudent person would do in the same circumstances. The regulations state that the negligence penalty will not be assessed if the preparer exercises due diligence in applying appropriate rules and regulations to information provided by the taxpayer [Reg. Sec. 1.6694-1(a)(i)].

Additional relief from the negligence penalty is provided where the preparer in good faith takes a position contrary to the rules and regulations if he or she has a reasonable basis for believing that such a rule or regulation does not accurately reflect and follow the code [Rev. Rul. 78-344,

* Edward J. Schnee is Professor of Accountancy and Kathleen J. Bindon is Assistant Professor of Accountancy, both at the University of Alabama. Craig A. Ellis is with Peat, Marwick, Mitchell & Co. in Miami.

1978-2, CB 334]. A problem exists as to whether these contrary positions taken by the preparer must be disclosed in the tax return.

Temporary regulations issued to clarify the 1976 code revisions stated that a preparer need not disclose contrary opinions which are based on case law [Sec. 404.6694-1A-6]. However, the regulation went on to state that in instances where there is no case conflict with a disputed rule or regulation, disclosure on the return of that disputed rule or regulation and the grounds for disagreement would constitute good faith on the part of the preparer. If all information about a transaction appears on the return, is that sufficient evidence of good faith, or must the grounds for disagreement also always be disclosed? The final regulations were silent on these questions and no guidelines were presented regarding disclosure.

The preparer must look for guidance to "Statement on Responsibilities in Tax Practice No. 10" entitled *Positions Contrary to Treasury Department or Internal Revenue Service Interpretations of the Code* (AICPA, 1977). Statement No. 10 requires disclosure in very rare cases—only those in which the preparer's position is contrary to a specific code provision or a Supreme Court decision. This occurs infrequently as most disagreements are with regulations and/or rulings. Statement No. 10 does not require disclosure in these situations, but it is suggested if the regulation is legislative rather than interpretive. In addition, disclosure of conflicts with court decisions, other than those of the Supreme Court, are not required.

There also are additional penalties assessed for miscellaneous activities associated with tax return preparation (Sec. 6695). They include the following: $25 for failure to furnish a copy of the return to the taxpayer, sign the return, or furnish identifying number; $50 for failure to retain a copy of returns prepared or a list of taxpayers for whom returns were prepared; $100 for failure to file a correct information return; and $500 for negotiation of any check issued to a taxpayer other than the preparer. For all of these penalties, except check negotiation, the penalty will not be assessed if the preparer can show that the failure was due to reasonable cause and not willful neglect [Sec. 6695(a)-(f)].

TEFRA imposes a new civil penalty for persons who knowingly aid in or abet the preparation of tax returns or any other tax-related document which results in the substantial understatement of tax liability [Sec. 6701(a)]. A penalty of $1,000 ($10,000 if the document relates to a corporation) is imposed per violation with the stipulation that a preparer can be assessed only one penalty for each taxpayer assisted per period [Sec. 6701(b)]. The taxpayer is not required to consent to or even have knowledge of the activity of the preparer [Sec. 6701(d)]. In general, these Section 6701 penalties can be assessed in addition to other penalties. However, Section 6701 penalties cannot be assessed where Section 6694(a) negligence penalties are imposed. The IRS is allowed to choose which penalty to assess if both may apply to a certain set of facts.

TEFRA also includes a penalty for substantial understatement of tax liability [Sec. 6661]. This penalty is assessed directly on the taxpayer. However, since many preparers pay all penalties assessed on a return, this penalty will, in many cases, also fall on the preparer. Substantial understatement occurs if the amount of the understatement exceeds the greater of (1) 10 percent of the tax required to be shown, or (2) $5,000 ($10,000 for a corporation) [Sec. 6661(b)]. Understatement is the excess of the amount of tax required to be shown over the amount of tax imposed which is shown on the return [Sec. 6661(b)(2)(A)(i) and (ii)].

The TEFRA penalty was 10 percent of the underpayment of tax liability attributable to the understatement. However, Congress increased the penalty to 20 percent in the Tax Reform Act (TRA) of 1986. At almost the same time, Congress also approved P.L. 99-509 budget reconciliation legislation, which further increased the penalty to 25 percent, repealing the 20 percent penalty in the TRA of 1986. Confusion arose because President Reagan signed the reconciliation legislation on October 21, 1986, one day before he signed the TRA of 1986. In essence, the increase to 20 percent was repealed before it had been signed into law. However, Stan Grimm of the House of Representatives Legislative Counsel office indicated that the reconciliation legislation is controlling.

The provision in the reconciliation legislation applies to penalties assessed after October 21, 1986. Therefore, the increase to 25 percent could affect returns filed as early as January 1, 1983, under the three-year statute of limitations and even earlier in cases involving fraud, which have no statute of limitations.

Two specific provisions for reducing the amount of the understatement are included in the TEFRA rules. First, a reduction will be allowed for that portion of the understatement which is attributable to the tax treatment of any item for which there exists substantial authority [Sec. 6661(b)(2)(B)(ii)]. Second, a reduction will be allowed for any item where the relevant facts regarding the tax treatment of the item are adequately disclosed, either in the return itself or in a statement attached to the return [Sec. 6661(b)(2)(B)(iii)]. Special rules apply to tax shelter items. The substantial authority requirement is applicable in addition to the requirement that the taxpayer must reasonably believe that the tax treatment of an item more likely than not was the proper treatment [Sec. 6661(b)(2)(C)(i)(II). The reasonable belief may be based either on good faith reliance on the opinion of a professional tax advisor who has analyzed pertinent facts and authorities or on the taxpayer's own analysis of such facts and authorities. The Secretary is allowed to waive Section 6661 penalties if the taxpayer can show there was reasonable cause for part or all of the understatement and that the taxpayer acted in good faith [Sec. 6661(c)].

The concept of substantial authority is not defined in TEFRA. The Conference Committee explained that this standard was adopted because it is a new standard and will leave the courts free to look at the purpose of the TEFRA provisions in determining substantial authority in any particular case [No. 97-760, 1982-2 CB 650]. Whether the taxpayer's position was or is supported by substantial authority will be determined on a case-by-case basis and will depend

upon the circumstances of each individual case. Some guidance is contained in the Conference Committee Report which states that:

> It will be necessary to weigh court opinions, Treasury Regulations and official administrative pronouncements (such as revenue rulings and revenue procedures) that involve the same or similar circumstances and are otherwise pertinent, as well as Congressional intent reflected in the committee reports, to determine whether the position is supported by present law and may be taken with the good faith expectation that it reflects the proper treatment of the item. [No. 97-760, 1982-2 CB 650]

It appears that congressional intent is to provide the courts with flexibility which will allow them to penalize those taxpayers taking highly aggressive filing positions while not penalizing taxpayers who attempt, in good faith, to assess fairly their taxes.

Additional guidance as to the interpretation of substantial authority was contained in the proposed regulations under Section 6661 issued by the Treasury on March 10, 1983. The final regulations were issued on March 22, 1985. The determination of substantial authority is made by analyzing the relevant authorities in light of the pertinent facts and circumstances. This entails evaluating the authorities that support the taxpayer's position as well as those which are contrary to it. The types of items that constitute authority are described as follows:

> Applicable provisions of the Internal Revenue Code and other statutory provisions; temporary and final regulations construing such statutes; court cases; administrative pronouncements (including revenue rulings and revenue procedures); tax treaties and regulations thereunder, and Treasury Department and other official explanations of such treaties; and Congressional intent as reflected in committee reports, joint explanatory statements of managers included in conference committee reports and floor statements made prior to enactment by one of a bill's managers. [Reg. Sec. 1.6661-3(b)]

Authority specifically does not generally include treatises, legal periodicals, legal opinions or opinions rendered by other tax professionals, descriptions of statutes prepared after enactment, actions on decisions, technical memoranda, written determinations (except where the determination is issued to the taxpayer or the taxpayer is named in the written determination), and proposed regulations.

In Regulation 1.6661-3(a)(2), further explanation is provided as to what standard should be applied in determining substantial authority. It states:

> The substantial authority standard is less stringent than a "more likely than not" standard (that is, a greater than 50-percent likelihood of being upheld in litigation) but stricter than a reasonable basis standard...

The regulation goes on to further explain that a position on the tax treatment of an item which is arguable but fairly unlikely to prevail in court would satisfy the reasonable basis standard but not the substantial authority standard.

How to analyze the substantial authority issue is an area where specific guidelines would have been helpful. The regulations do state that "the weight of the authorities for the tax treatment of an item is determined by the same analysis that a court would be expected to follow in evaluatlng the tax treatment of an item" [Reg. Sec. 1.661-3(b)(2)]. The weight of an authority depends on the persuasiveness and the relevance, as well as the source.

The proposed regulations contained two examples of how to determine substantial authority, given a specific set of circumstances and authorities. In the examples, it appeared that substantial authority was based on the quantity of authority and not the quality. The final regulations do not contain any such specific examples to provide guidance, but rather are entirely descriptive in nature. They do indicate that it is possible for a taxpayer to have substantial authority for a position that is supported only by a well-reasoned application of relevant statutory provisions [Reg. Sec. 1.661-3(b)(3)].

Substantial authority is only one of the two ways to avoid the substantial understatement penalty. It also may be avoided with respect to any item for which the relevant facts regarding the tax treatment of the item are adequately disclosed in the return or in a statement attached to the return [Sec. 6661(b)(2)(B)(ii)]. Disclosure is not considered adequate if it consists of integrated information arranged in such a way that the IRS may not reasonably be expected to ascertain the identity of the item, its amount, and the nature of the potential controversy surrounding the item or items. If the IRS could not reasonably be expected to ascertain the necessary information from the return itself, a statement containing the necessary information must be attached to the return [Reg. Sec. 1.6661-4(b)(3)]. As is the case with Section 6694 penalties, disclosure may be contrary to the recommendations of Statement No. 10, which suggest disclosure only in rare cases, such as for a position contrary to the code or a Supreme Court decision.

Survey Results and Implications

A survey was undertaken to determine the anticipated response to the new penalties by tax return preparers and by users of tax return preparation services. To examine the penalties from the preparers' viewpoint, a questionnaire was sent to both CPA and non-CPA preparers. A slightly different questionnaire was sent to taxpayers whose returns are prepared by third parties. Table 1 provides a breakdown of the number of questionnaires sent and responses obtained.

The names of the one hundred CPAs were obtained by a random sample from the AICPA's National List of Members. Although not all CPAs are members of the AICPA, AICPA membership should be sufficiently representative of tax return preparers not to bias the results. Since the sample was drawn from the national population of CPAs, the CPA responses are generalizable to the national population. Thirty-seven usable questionnaires were received, for a response rate of 37 percent. Developing the list of non-CPA preparers was difficult because there is no national list of tax return preparers. The authors were able to obtain from the Birmingham office of the IRS a list of preparers in the state of Alabama. One hundred preparers, excluding CPAs, were randomly selected from this list. Although a national sample of non-CPA preparers could not be generated due to lack of information, there is no reason to believe that non-CPA preparers in other parts of the country differ greatly from

Table 1

Response Rates

		Questionnaires Sent	Usable Responses	Percent, Each Group	Percent, Total Responses
Preparers	CPA	100	37	37	26.5
	Non-CPA	100	16	16	
Taxpayers	Corporation	50	26	52	35.3
	CEO & CFO	100	27	27	
TOTAL		350	106	30	

those in Alabama. Sixteen responded to the questionnaire, for a response rate of 16 percent. While this rate is not large enough to allow generalization, the responses of the non-CPAs provide some interesting contrasts to those of the CPA preparers.

A list of persons whose tax returns are prepared by third parties was unavailable from any source. Both the IRS and GAO were unwilling to furnish this information on the grounds of confidentiality. It was assumed that large corporations and their highly-compensated officers would be likely to use tax return preparation services. The fifty largest corporations (by sales volume) in Alabama were selected. This population should not differ substantially from the national population because both in Alabama and nationally it is likely that large corporations and CEOs and CFOs would use public accounting firms to prepare their tax returns. In addition, it was believed that any possible bias which might exist would be offset by an increased response rate. A questionnaire was sent to the controller of each of these corporations with instructions to complete the form for the company. A separate questionnaire was sent to the CEO and CFO of each company. The instructions requested the CEO or CFO to complete the questionnaire as an individual and not as the corporation's representative. Twenty-six corporations responded, for a 52 percent response rate. Twenty-seven (27 percent) of the CEOs and CFOs responded.

Responses by Preparers

In general, the typical preparer will continue on as before TEFRA, with only slight concessions to the new provisions. This absence of change is one of the most important findings. The basic conclusion is that preparers do not see the new laws as much of a problem, at least in terms of compliance. As discussed later, the laws will cause changes in tax return preparation practices and a decrease in the ability of the preparer to function as a client advocate. A summary of responses to all questions by tax return preparers is contained in Table 2.

The major area of concern is the possibility that the TEFRA penalties will inhibit the preparer's ability to function as a client advocate (Question 4). CPA and non-CPA preparers differed on this issue. Twenty-five CPAs (68 percent) felt that the penalties will hinder their client advocacy ability. Only six (38 percent) of the non-CPAs felt that the new penalties interfere with their client advocacy. However, 44 percent of the non-CPAs responded that they plan on being more conservative (Question 1). It would seem that being more conservative could hinder client advocacy if it means passing up deductions which are somewhat controversial. Possibly, non-CPAs did not view this as hindering client advocacy.

The fact that the new penalties will interfere with the advocacy function is exacerbated by the perceived lack of quality improvements in tax returns. Over 50 percent of both groups felt that neither TEFRA penalties nor the 1976 penalties improved tax return quality (Questions 7 and 6). In a preparer penalty study conducted by the GAO, it concluded that the effectiveness of preparer penalties is indeterminate (Tax Notes, 1983).

Regarding the preparers' general reaction to the TEFRA penalties, both groups indicated there would be little reaction by their clients to the new penalties, with the exception of clients placing more responsibility on the preparer to avoid the penalties (Question 1). It is interesting to note that 56 percent of non-CPA preparers expect more conservatism by their clients while only 19 percent of the CPA preparers had a similar expectation. It is possible that this difference is the result of non-CPAs originally being more aggressive, but this cannot be determined from the responses.

The majority of the respondents did anticipate making changes in their practices to comply with the new law. The dominant changes were increased research and documentation (Question 2). In addition, a sizable number of respondents, 35 percent of CPAs and 44 percent of non-CPAs, expect to take more conservative approaches to controversial items.

One of the major issues for preparers is how to avoid the substantial underpayment penalties. These can be avoided through substantial authority and/or disclosure. Among CPAs, 32 percent expect to use substantial authority while only 24 percent expect to use disclosure (Question 3). By contrast, only 13 percent of non-CPAs expect to use substantial authority whereas 56 percent plan to use disclosure. This is especially surprising because two-thirds of both groups felt that current levels of disclosure are sufficient to avoid the penalty (Question 10). One possible explanation is that CPAs feel more comfortable with the concept of substantial authority than non-CPAs. Some CPAs (38 per-

Table 2

Preparer Responses

Question		CPA	Non-CPA
1	Anticipated Reaction by clients		
	Be more conservative	7 (19%)	9 (56%)
	Little change	14 (38%)	7 (44%)
	Place greater responsibility on preparer	27 (73%)	8 (50%)
	Reduce requests for tax services	1 (3%)	1 (6%)
2	Actions necessary to comply with new law		
	Increased research	25 (68%)	10 (63%)
	Increased documentation	32 (87%)	13 (81%)
	More conservative treatment of controversial item	13 (35%)	7 (44%)
	No change from past	1 (3%)	2 (13%)
3	Anticipated means for avoiding penalty		
	Substantial Authority	12 (32%)	2 (13%)
	Disclosure	9 (24%)	9 (56%)
	Both equally often	14 (38%)	4 (25%)
4	Ability to function as an advocate		
	Decreased by TEFRA	25 (68%)	6 (38%)
	No change by TEFRA	11 (30%)	9 (56%)
5	Effect of TEFRA on number of clients		
	Increase	1 (3%)	1 (6%)
	Decrease	0 (0%)	2 (13%)
	No change	36 (97%)	11 (69%)
6	Effect of 1976 penalties on tax return quality		
	Improved	14 (38%)	5 (31%)
	No change	21 (57%)	8 (50%)
7	Effect of TEFRA on tax return quality		
	Improved	11 (30%)	5 (31%)
	No change	25 (68%)	9 (56%)
8	You have substantial authority for a position; however		
	A there is one district court decision contrary		
	no effect	33 (89%)	9 (56%)
	substantial authority against	4 (11%)	3 (19%)
	B there is a Tax Court decision contrary		
	no effect	23 (62%)	8 (50%)
	substantial authority against	10 (27%)	5 (31%)
	C there is a court of appeals decision from a circuit other than the one taxpayer is located contrary		
	no effect	24 (65%)	7 (44%)
	substantial authority against	8 (22%)	5 (31%)

NOTE: Percentage of respondents selecting this response in parenthesis.

Table 2

(continued)

Questions	CPA	Non-CPA
9 What would be substantial authority for disregarding a regulation		
Nothing	5 (14%)	5 (31%)
Committee reports	8 (22%)	0 (0%)
Journals/tax service	6 (17%)	0 (0%)
Code	4 (11%)	1 (6%)
Outside council	2 (6%)	0 (00%)
Revenue Rulings/Letter Rulings	3 (19%)	3 (19%)
10 Is current disclosure sufficient to avoid penalty under TEFRA disclosure requirement		
Yes	25 (68%)	11 (69%)
No	10 (27%)	3 (20%)

11 Rank the following as substantial authority

Non-CPA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Not Rated**
Code	7	5									2
Revenue rulings	3	2	5	3	1						3
SC decisions	3	3	2	2	2						3
Other court decisions		1	2	1	1	2					6
Opinions of outside council						1				1	12
TC memo			1	2	3						8
Treatises					1				1		12
Regulations	2	3	2	1	1	1					4
Tax service		1		2		1	1				8
Letter rulings						2	1	1			10

CPA	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Not Rated**
Code	20	3	2	2							1
Revenue rulings		2	5	3	5	9	2				2
SC decisions	8	10	6	4							
Other court decisions		2	5	11	7	1					1
Opinions of outside council				1			1	4	5	5	1
TC memo		1	3	3	7	7	3				3
Treatises			1		1	2	3	3	2	3	13
Regulations		10	5	2	5	2		1	1		
Tax service					1	1	3	5	4	2	11
Letter rulings						1	10	2	2	3	9

cent) and non-CPAs (25 percent) indicated that they plan to use both substantial authority and disclosure equally often.

The preparers' interpretation of the phrase "substantial authority" also was examined. Their responses were made before most had had an opportunity to study the proposed regulations available at the time of the study. Comparing responses between groups and with the proposed regulations yields some interesting observations.

The first question (No. 9) asked what constitutes substantial authority to disregard a regulation. This specific question was included because of the Supreme Court's decision in *Vogel Fertilizer* [634, F.2d 497 (8-13-80)]. In this case, the Court ruled that part of the controlled group regulations were invalid. This question attempted to elicit from the participants what authorities might be needed in the future. In general, the CPAs were more willing to consider the existence of substantial authority contrary to a regulation. However, 14 percent of the CPAs and 31 percent of the non-CPAs said nothing would qualify. The CPAs listed (in order of number of responses) committee reports, journals and tax service, the code, and outside council memoranda. The proposed regulations specifically precluded the use of several of these items, as do the final regulations. In addition to these items, 9 percent of the CPAs and 19 percent of the non-CPAs listed revenue rulings or letter rulings. Inasmuch as the IRS will never issue a ruling that conflicts with a regulation, these answers show a distressing lack of understanding of basic tax research sources, on the part of both CPAs and non-CPAs. Educating these practitioners should be a high priority for the IRS and those academics involved in continuing education.

Three questions dealt with the effect on substantial authority of contrary court decisions, as the IRS always has mantained the right to relitigate issues it believes have been incorrectly decided. For each question, there is substantial authority suporting the taxpayer's position. However, there is one contrary decision in district court (not the taxpayer's district), Tax Court, and Court of Appeals other than the one in which the taxpayer resides. For all questions, the majority of both groups answered that the contrary decisions would have no effect. In each case, a significantly higher percentage of CPAs than non-CPAs responded no effect. This is similar to the results concerning the regulation.

The proposed regulations contained two examples in which there was a contrary court decision. In the example in which two of the three authorities favor the taxpayer, they conclude substantial authority exists. In the case where only one of four favors the taxpayer, substantial authority is deemed not to exist. It appears that substantial authority conclusions were reached based on the quantity of the sources. None of the study respondents indicated that the substantial authority decision should be made on the basis of a numerical count. The final regulations do not contain any examples, perhaps indicating that the Service wanted to move away from a quantity determination of substantial authority.

Finally, the respondents were asked to rank a list of items as potential substantial authority. Included in the list of both CPAs and non-CPAs were treatises, tax services, and outside council memoranda. Both the proposed and final regulations specifically exclude these items. Given the fact that the courts have cited these items as precedent, there appears to be a conflict. The regulations state that the analysis of authority should be the same as that used by the courts, which would include use of treatises, tax services, and outside council memoranda. The Service should reconsider these prohibitions. It would be preferable for the regulations to state that these items are not primary authority but will be given weight depending upon the facts and the existence or absence of other authority.

Taxpayer Responses

A different questionnaire was sent to the taxpayers. The corporate controllers were asked to respond for the business, whereas the CEOs and CFOs were requested to respond as individuals. Table 3 summarizes their responses. The first question concerned the individual's familiarity with TEFRA. Approximately 70 percent of the controllers indicated familiarity while over 50 percent of the CEOs and CFOs said they were unfamiliar with the new penalties. The knowledge of the controllers may be directly related to the higher penalty of $10,000 for corporations.

Taking a more conservative position to avoid penalties is one possible response to the TEFRA penalties. Fewer than one-third of the respondents are planning this action (Question 2). However, 75 percent of the CEOs and CFOs expect their preparer to be more conservative (Question 3), perhaps because it is the preparer who, in all likelihood, will bear the cost of the penalties. The respondents' indication that the majority does not plan to be more conservative conflicts with their responses to Question 7. When asked if they would not claim a deduction in order to avoid a potential penalty, only three responded affirmatively. If they are not going to waive possible deductions, what type of conservative action will they and their preparers take?

The final two questions (Questions 5 and 6) were the same as those on the preparer questionnaire and related to improvement of tax return quality due to the 1976 and TEFRA penalties. Approximately one-half of the CEOs and CFOs responded that both sets of penalties improved quality. This differs substantially from the preparers' response in which over half responded negatively. The largest difference in response to 1976 and TEFRA penalties was from the controllers. Only one-third felt that the 1976 penalties improved quality whereas 55 percent felt that TEFRA will improve quality. A partial explanation may be that although controllers indicated they will not pass up deductions, perhaps they truly plan on being more conservative since the new penalties can be levied against the corporation. To the extent this reduces indefensible deductions, the penalties will accomplish their purpose. If they simply force smaller corporations which cannot aford the penaltles to sacrifice legitimate items, the penalties will be contrary to good tax policy.

Policy Implications

In 1976, Congress attempted to regulate the tax preparer industry by adopting penalties which were imposed on

Table 3

Responses From Taxpayers

Question		CEO	CFO	Controller
1	Familiar with TEFRA			
	Yes	6 (42.9)	6 (46.2)	18 (69.3)
	No	8 (57.1)	7 (53.8)	8 (30.7)
2	Anticipated Actions			
	Be more conservative	2 (14.3)	1 (7.7)	5 (19.2)
	Place greater responsibility on preparer	3 (21.4)	1 (7.7)	4 (15.4)
	Take no action	1 (7.1)	4 (30.8	4 (15.4)
	Prepare our return	0 (00.0)	0 (00.0)	1 (3.8)
3	Anticipated Actions by Preparer			
	Be more conservative	5 (35.7)	4 (30.8)	5 (19.2)
	Require more documentation	3 (21.4)	4 (30.8)	6 (23.1)
	Charge higher fees	3 (21.4)	1 (7.7)	2 (7.7)
	No action	0 (0.0)	0 (00.0)	2 (7.7)
4	Means for avoiding penalty			
	Substantial authority	0 (0.0)	2 (15.4)	4 (15.4)
	Disclosure	4 (28.6)	2 (15.4)	7 (26.9)
	Both equally often	2 (14.3)	1 (7.7)	6 (23.1)
5	Effect of pre-TEFRA Penalties on Tax Return Accuracy			
	Improved	2 (14.3)	3 (23.1)	6 (23.1)
	Not Improved	4 (28.6)	3 (23.1)	12 (46.2)
6	Effect of TEFRA Penalties on Tax Return Accuracy			
	Improved	3 (21.4)	3 (23.1)	10 (38.5)
	Not improved	3 (21.4)	3 (23.1)	8 (30.7)
7	Refused to claim Deduction or Credit due to fear of penalty			
	Yes	0 (00.0)	1 (7.7)	2 (7.7)
	No	6 (38.5)	5 (38.5)	16 (61.5)

NOTE: Percentage of respondents selecting this response in parenthesis.

negligent preparers. In 1982, TEFRA expanded these penalties. Given the GAO's conclusion that the effectiveness of penalties is indeterminate, the authors recommend that the Treasury undertake a major study of preparer penalties to determine whether they have been effective and whether they could be restructured to obtain the same quality of tax return preparation without interfering with the taxpayer/preparer relationship.

What was the major reason for Congress's adoption of the TEFRA penalties? The reason appears to be primarily to stop abusive tax shelters. The actual penalty provisions provide the IRS with the power to more than just stop abusive shelters. During a question and answer session following a speech on preparer penalties, a district director of the IRS stated that in his region, the monetary penalties would be applied to force some preparers out of business. He said that only those involved with abusive shelters would be affected. The power to destroy a preparer is a significant change from the prior law under which only criminal penalties could have had such an effect. Given that the burden of proof is on the preparer in the civil penalty cases, a major change has taken place apparently without sufficient discussion and consideration.

Another major change brought about by the TEFRA penalties is the subtle shift of the preparer's role from taxpayer's advocate to IRS agent. The first example is the inclusion of revenue rulings in the term "rules and regulations" in Section 6694. The term should be restricted to the code and regulations. These undergo publication, comment, and review before they are adopted. Revenue rulings, on the other hand, are IRS National Office decisions which are not open to comment or review. The rulings are binding on IRS agents. By making them binding on preparers also, the preparer must start acting as an agent.

The TEFRA provisions move the preparer's role another step closer to that of an agent in a second way. Before taking

a position on a return, the preparer must be more certain that the position is correct. In addition, more disclosure is necessary. These requirements are substantially more strict than those contained in Statement on Responsibility in Tax Practice No. 10. The result is predictable. Legitimate positions which a taxpayer could, and should, take cannot be taken by a preparer without subjecting himself to a possible penalty. As a result, taxpayers who use preparers may pay more than their fair share of taxes. This may become even more of a problem with the recent increase in the substantial underpayment penalty from 10 to 25 percent. Although this penalty is assessed on the taxpayer, many preparers ultimately pay all penalties assessed on a return. The increased penalty may lead both taxpayers and preparers to be more conservative. The self-assessing system works because taxpayers have been able to assume that the preparers were their advocates. This shift in roles may force an unknowledgeable taxpayer to prepare his or her own return or to allow a preparer, who is forced to function in a role similar to that of an IRS agent, to prepare it for him or her.

Another shift in policy is the increased requirement to audit information provided by the taxpayer. Although the regulations under Section 6694 do not require audits of all information, there is the exception in those cases in which the preparer has reason to believe the information is incorrect. The preparer no longer can accept all of the taxpayer's information. Some review procedure is necessary and in extreme cases an audit may be called for.

The final, and perhaps most significant, shift in policy is from a Congressionally-approved uniform standard to substantial authority, an undefined concept which will be determined by the courts on a case-by-case basis. While the regulations under Section 6661 contain some guidance for determining when substantial authority exists, more detailed guidelines would have been helpful. No two cases ever are identical, although similar questions of law may be involved, and the results will not be consistent. In the meantime, preparers are left to their own devices to guess what is required of them and to supply their own definitions. This cannot aid the regulation of tax preparers as regulation requires uniform and defined standards which the preparer knows, understands, and can follow.

NOTE: All references are to the Internal Revenue Code of 1954, as amended to date. A summary of major code sections discussed in the paper is contained in Appendix A.

References:

American Institute of Certified Public Accountants. Statement on Responsibilities in Tax Practice No. 10, *Positions Contrary to Treasury Department or Internal Revenue Service Interpretations of the Code* (New York: AICPA, 1977).

"GAO Evaluates Administration of Preparer Penalties." *Tax Notes*, January 17, 1983: 254-260.

Kamerow, M.L. "Return Preparer Problems Since the Tax Reform Act of 1976." *39th Annual NYU Institute on Federal Taxation, 1980*, Vol. 2, New York, 1981: 37-1 to 37-29.

Appendix A

Highlights of Preparer Penalty Provisions

Section	Source	Penalized Activity	Penalty
7206	1939 Code	Willfully aiding or assisting in the preparation of false or fraudulent returns	Criminal penalties of $5,000 fine or 3 year imprisonment, or both
7402	1939 Code	Any activity deemed by the IRS to inhibit enforcement of internal revenue laws	District Court injunction to prevent such activity
6694(a)	1976 Act	Understatement of tax liability resulting from negligence or intentional disregard of rules or regulations	$100 penalty
(b)		Willful attempt to understate tax liability	$500 penalty, reduced by 6694(a) penalty if both are assessed
6695(a)	1976 Act	Failure to furnish a copy of the return to the taxpayer	$25 per failure
(b)		Failure to sign return	$25 per failure
(c)		Failure to furnish identifying number	$25 per failure
(d)		Failure to retain copy or list of returns prepared	$50 per failure

Appendix A (continued)

6695(e)		Failure to file correct information return	$100 per failure
(f)		Negotiation of refund check	$500 per check
7407	1976 Act	Conduct subject to 6694 and 6695 penalties, misrepresentation of eligibility to practice before IRS, guaranteed payment of refund or allowance of credit, or any other fraudulent or deceptive conduct	District Court injunction to prevent such activity
6661*	TEFRA	Substantial understatement of tax liability [exceeds greater of 10% of tax required to be shown or $5,000 ($10,000 for a corporation)]	10% of underpayment attributable to understatement. Other penalties may be assessed.
	TRA	Same as above. Never enacted.	20% of underpayment attributable to understatement. Other penalties may be assessed.
	PL 99-509	Same as above.	25% of underpayment attributable to understatement. Other penalties may be assessed.
6701	TEFRA	Aiding or abetting in the preparation of a return or other tax-related document which results in substantial understatement of tax liability	$1,000 per return or other document ($10,000 if related to a corporation). Limited to one penalty per taxpayer assisted. Applies in addition to other penalties except for 6694 penalties. IRS may choose which to apply.

*These penalties are assessed on the taxpayer. However, since most preparers pay all penalties assessed on a return, this penalty in most cases, also will fall on the preparer.

Nevada Economic Indicators

Statewide Statistical Data

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986	PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986
Total Labor Force (000's)	549.3	550.8	552.4	550.8	+ 0.4	+ 6.5
Total Employment (000's)	520.7	520.7	519.4	520.3	+ 0.0	+ 9.4
Unemployment (000's)	28.6	30.1	33.0	30.5	+ 6.6	– 27.0
Unemployment Rate	5.2	5.5	6.0	5.5	+ 6.5	+ 6.3
Unemployment Rate (Seasonally Adjusted)	5.5	5.6	5.7	5.6	+ 1.8	– 30.9
Agricultural Empl. (000's)	6.2	4.9	4.5	5.2	– 34.2	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	480.5	481.0	481.4	481.0	+ 0.9	+ 5.9
Mining	6.5	6.5	6.6	6.5	+ 0.5	+ 3.7
Contract Construction	29.0	28.3	27.8	28.4	– 3.8	+ 20.2
Manufacturing	22.6	22.5	22.7	22.6	+ 0.0	+ 2.3
Transportation & Utilities						
Transportation	15.7	15.8	16.0	15.8	+ 0.8	+ 10.7
Railroads	1.3	1.3	1.3	1.3	+ 0.0	+ 0.0
Air	4.0	4.1	4.0	4.0	+ 0.8	+ 34.4
Public Utilities	11.4	11.4	11.3	11.4	– 1.2	+ 1.5
Total Trade	97.1	98.4	99.5	98.3	+ 2.1	+ 4.1
Wholesale Trade	17.1	17.1	17.1	17.1	+ 0.6	+ 6.9
Retail Trade	80.0	81.3	82.4	81.2	+ 2.4	+ 3.6
Finance, Ins., Real Estate	23.1	23.2	23.3	23.2	+ 0.9	+ 4.5
Service Industries	211.3	211.2	210.2	210.9	– 0.6	+ 6.5
Hotels, Amusement and Recreation Combined	132.1	131.3	130.1	131.2	– 2.0	+ 4.8
Medical and Health	20.4	20.5	20.5	20.5	+ 1.3	+ 10.0
Total Government	63.8	63.7	64.0	63.8	+ 7.3	+ 3.5
Federal	10.8	10.8	10.9	10.8	– 1.5	+ 4.2
State and Local	53.0	52.9	53.1	53.0	+ 9.3	+ 2.1
Education	24.8	24.8	25.1	24.9	+ 24.5	+ 5.5
Average Weekly Earnings in Selected Industries						
Mining	607.71	622.49	605.75	611.98	+ 0.4	+ 9.5
Construction	622.76	579.01	625.60	609.12	– 0.3	+ 4.9
Manufacturing	389.24	392.70	400.61	394.18	+ 3.9	+ 5.5
Public Utilities	569.06	602.34	596.45	589.28	+ 7.1	+ 7.6
Trade	289.82	293.13	289.67	290.87	– 0.7	+ 4.6
Average Weekly Hours in Selected Industries						
Mining	43.1	43.5	42.9	43.2	+ 0.2	+ 0.9
Construction	38.3	35.5	38.1	37.3	– 0.8	+ 6.9
Manufacturing	39.8	41.6	41.6	41.0	+ 1.5	+ 1.5
Public Utilities	39.3	41.8	43.6	41.6	+ 4.7	– 0.6
Trade	33.7	33.5	33.8	33.7	– 1.8	– 1.3
Average Hourly Earnings in Selected Industries						
Mining	14.10	14.31	14.12	14.18	+ 0.3	+ 20.5
Construction	16.26	16.38	16.42	16.35	+ 0.7	– 1.7
Manufacturing	9.78	9.44	9.63	9.62	+ 2.3	+ 3.9
Public Utilities	14.48	14.41	13.68	14.19	+ 2.5	+ 11.7
Trade	8.60	8.75	8.57	8.64	+ 1.3	+ 5.9
Construction Activity						
Residential ($000's)	63,500	51,700	82,200	197,400	– 17.5	– 16.3
Nonresidential ($000's)	56,600	38,500	94,600	189,700	+ 43.3	+ 18.9
Nonbuilding ($000's)	37,400	1,500	17,300	56,200	– 22.7	– 3.3
Total ($000's)	157,500	91,700	194,100	443,300	– 0.2	– 2.3
# of New Dwelling Units	738	1,011	792	2,541	– 16.5	+ 23.9
Tax Collections ($)						
Liquor	1,370,363	1,011,586	1,101,176	3,483,125	+ 2.6	– 5.5
Cigarette	1,762,996	1,657,787	1,532,873	4,953,656	– 3.5	+ 2.1
Fuel	4,327,679	4,295,548	3,657,443	12,280,670	– 11.6	+ 0.0
Quarterly Taxable Sales ($000's)	–	–	–	2,503,528	+ 5.3	+ 14.0
Quarterly Gaming Revenues ($000's)	–	–	–	857,257	– 6.3	+ 11.8
Highway Traffic Flow 17 Selected Stations (Avg. Daily)	126,418	116,099	113,496	118,671	– 19.9	+ 12.3

Las Vegas Standard Metropolitan Statistical Area

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986	PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986
Total Labor Force (000's)	315.8	317.9	311.8	308.7	– 1.4	+ 4.3
Total Employment (000's)	298.3	299.9	292.6	290.7	– 1.5	+ 7.3
Unemployment (000's)	17.5	18.0	19.2	18.0	– 0.6	– 28.0
Unemployment Rate	5.5	5.7	6.2	5.8	+ 0.8	– 31.0
Unemployment Rate (Seasonally Adjusted)	5.6	5.7	5.8	5.7	– 1.7	– 31.3
Agricultural Employment (000's)	1.5	1.2	1.1	1.3	– 33.3	– 2.6
Establishment Based Industrial Employment						
Total All Industries (000's)	268.8	270.5	271.7	270.3	+ 2.0	+ 4.5
Mining	0.3	0.3	0.3	0.3	+ 0.0	+ 0.0
Contract Construction	17.0	16.8	16.6	16.8	– 3.4	+ 14.3
Manufacturing	8.2	8.2	8.3	8.2	+ 0.4	+ 2.9
Transportation & Utilities						
Transportation	9.3	9.5	9.6	9.5	+ 1.8	+ 12.7
Railroads	0.4	0.4	0.4	0.4	+ 0.0	+ 0.0
Air	3.0	3.0	3.1	3.0	+ 1.1	+ 31.9
Public Utilities	6.0	6.0	5.9	6.0	– 0.6	– 2.2
Total Trade	55.9	56.8	57.6	56.8	+ 2.8	+ 4.2
Wholesale Trade	9.3	9.3	9.0	9.2	+ 0.0	+ 7.0
Retail Trade	46.6	47.5	48.3	47.5	+ 3.2	+ 3.4
Finance, Ins., Real Estate	13.8	13.9	13.4	13.7	+ 0.0	+ 3.0
Service Industries	125.9	126.8	127.2	126.6	+ 1.1	+ 3.1
Hotels, Gaming & Recreation	83.0	83.2	83.5	83.2	+ 0.3	+ 4.0
Total Government	32.4	32.3	32.3	32.3	+ 9.2	+ 5.7
Federal	5.9	6.0	6.1	6.0	+ 0.0	+ 7.1
State and Local	26.5	26.3	26.2	26.3	+ 11.6	+ 14.5
Education	12.9	12.7	12.7	12.8	+ 27.7	+ 5.5
Construction Activity						
Las Vegas						
Residential ($000's)	9,479	13,722	7,867	31,068	– 25.0	– 9.4
Nonresidential ($000's)	25,436	24,693	7,065	57,194	+ 162.7	+ 69.2
Total Value ($000's)	34,915	38,415	14,932	88,262	+ 39.7	+ 31.5
# of New Family Units	198	583	148	929	– 8.6	– 1.4
North Las Vegas						
Residential ($000's)	531	146	155	832	– 3.4	–
Nonresidential ($000's)	598	524	316	1,438	– 55.0	–
Total Value ($000's)	1,129	670	471	2,270	– 44.1	–
# of Permits	8	2	2	12	+ 0.0	–
Quarterly Taxable Sales ($000's)	–	–	–	1,420,789	+ 16.6	+ 18.8
Quarterly Gaming Revenues ($000's)	–	–	–	602,388	+ 1.7	+ 11.8
Air Transportation-McCarran						
Passengers (Arr. & Depart.)	1,168,124	1,126,432	921,079	3,215,635	+ 5.6	+ 15.4
Cargo Enplaned (lbs.)	2,061,480	1,926,730	2,565,413	6,553,623	+ 28.0	+ 82.7
Cargo Deplaned (lbs.)	3,434,790	2,892,009	3,309,763	9,636,562	+ 34.8	+ 49.8
Highway Traffic Flow						
4 Selected Stations (Avg. Daily)	35,305	34,596	35,104	35,001	– 11.1	+ 10.3
Room Tax ($)						
Clark County	2,340,607	2,334,078	2,556,842	7,231,527	+ 11.3	+ 21.5
Las Vegas City	324,756	294,671	344,843	964,270	+ 6.9	+ 5.5
SMSA Total	2,681,060	2,642,250	2,914,247	8,237,557	+ 10.7	+ 19.3

Reno Standard Metropolitan Statistical Area

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986	PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986
Total Labor Force (000's)	138.8	139.0	139.3	135.8	– 2.0	+ 3.3
Total Employment (000's)	132.6	132.4	131.7	129.2	– 2.7	+ 5.8
Unemployment (000's)	6.2	6.6	7.6	6.6	+ 13.8	– 29.8
Unemployment Rate	4.4	4.8	5.4	4.9	+ 15.7	– 31.5
Unemployment Rate (Seasonally Adjusted)	5.0	4.9	5.1	5.0	+ 6.4	– 32.4
Agricultural Employment (000's)	0.8	0.6	0.6	0.7	– 30.0	+ 0.0
Establishment Based Industrial Employment						
Total All Industries (000's)	130.0	129.5	129.2	129.6	+ 0.8	+ 0.8
Mining	0.8	0.7	0.7	0.7	+ 4.8	+ 4.8
Contract Construction	7.[redacted]	7.3	7.1	7.3	– 5.2	+ 21.7
Manufacturing	8.5	8.3	8.4	8.4	+ 1.2	+ 3.7
Transportation & Utilities						
Transportation	4.7	4.7	4.8	4.7	+ 2.9	+ 15.4
Railroads	0.4	0.4	0.4	0.4	+ 0.0	+ 0.0
Public Utilities	4.1	4.1	4.0	4.1	– 0.8	+ 7.0
Total Trade	29.4	29.8	30.3	29.8	+ 2.5	+ 3.9
Wholesale Trade	6.5	6.5	6.5	6.5	+ 0.0	+ 1.6
Retail Trade	22.9	23.3	23.5	23.2	+ 2.8	+ 4.7
Finance, Ins., Real Estate	6.9	6.9	6.8	6.9	– 0.5	+ 9.0
Service Industries	52.1	51.6	50.8	51.5	– 2.5	+ 3.4
Hotels, Gaming & Recreation	30.0	29.5	28.7	29.4	– 4.5	– 0.3
Total Government	16.0	16.1	16.4	16.2	+ 7.8	– 0.8
Federal	2.8	2.8	2.8	2.8	– 3.4	+ 0.0
State and Local	13.2	13.3	13.6	13.4	+ 10.5	– 0.2
Education	7.6	7.7	8.0	7.8	+ 23.3	+ 5.0
Construction Activity Reno						
Residential ($000's)	3,867	8,631	3,857	16,355	– 21.8	– 31.3
Nonresidential ($000's)	6,131	6,538	5,908	18,577	– 30.8	+ 34.3
Total Value ($000's)	9,998	15,169	9,765	34,932	– 26.9	– 7.2
# of New Family Units	74	122	71	267	– 30.1	– 47.1
Sparks						
Residential ($000's)	1,792	748	3,546	6,086	+ 49.7	+ 106.5
Nonresidential ($000's)	1,100	677	811	2,588	– 60.0	– 86.4
Total Value ($000's)	2,892	1,425	4,357	8,674	– 17.6	– 60.5
# of New Family Units	45	19	87	151	– 24.9	+ 135.9
Washoe County (Unincorporated)						
Residential ($000's)	7,075	2,538	2,107	11,720	– 21.9	+ 12.1
Nonresidential ($000's)	1,352	693	2,133	4,178	+ 49.0	– 13.6
Total Value ($000's)	8,427	3,231	4,240	15,898	– 10.8	+ 4.0
# of New Family Units	75	29	21	125	– 20.9	+ 11.6
Quarterly Taxable Sales ($000's)	–	–	–	598,438	+ 0.7	+ 14.1
Quarterly Gaming Revenues ($000's)	–	–	–	157,602	– 16.4	+ 10.8
Air Transportation-Reno						
Passengers (Arr. & Depart.)	266,056	259,183	246,980	772,219	– 9.0	+ 21.0
Cargo Enplaned (lbs.)	547,578	652,068	810,378	2,010,024	+ 12.7	+ 19.5
Cargo Deplaned (lbs.)	822,817	835,478	971,300	2,629,595	+ 14.4	+ 29.1
Highway Traffic Flow 7 Selected Stations (Avg. Daily)	74,663	68,001	65,685	69,449	– 22.0	+ 13.4
Room Tax ($) SMSA Total	1,189,523	1,054,303	755,737	2,999,563	– 14.4	+ 3.7

Nevada Statistical Data by County

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986	PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986
CARSON CITY						
Total Labor Force	21,070	21,200	21,050	21,107	– 1.0	+ 6.7
Total Employment	20,060	20,040	19,870	19,990	– 1.5	+ 9.8
Unemployment	1,010	1,160	1,180	1,117	+ 9.5	– 29.5
Unemployment Rate	4.8	5.5	5.6	5.3	+ 10.6	– 33.9
Construction Activity						
Residential Value ($000's)	6,630	3,955	2,999	13,584	+ 40.5	+ 78.2
Nonresidential Value ($000's)	1,662	291	635	2,588	– 71.5	– 45.1
Total Value ($000's)	8,292	4,246	3,634	16,172	+ 14.9	+ 31.1
# of New Family Units	82	58	36	176	+ 33.3	+ 66.0
Quarterly Taxable Sales ($000's)	–	–	–	82,792	– 6.6	+ 9.9
Quarterly Gaming Revenues ($000's)	–	–	–	9,025	– 19.1	+ 7.7
CHURCHILL						
Total Labor Force	7,180	7,080	7,000	7,087	– 5.5	+ 7.2
Total Employment	6,750	6,580	6,470	6,600	– 7.0	+ 11.2
Unemployment	430	500	530	487	+ 20.7	– 28.4
Unemployment Rate	6.0	7.1	7.6	6.9	+ 27.8	– 33.1
Construction Activity						
Residential Value ($000's)	623	448	305	1,376	+ 146.2	+ 269.9
Nonresidential Value ($000's)	0	160	178	338	– 47.0	+ 20.7
Total Value ($000's)	623	608	483	1,714	+ 43.2	+ 162.9
# of New Family Units	7	5	5	17	+ 112.5	+ 183.3
Quarterly Taxable Sales ($000's)	–	–	–	21,694	– 16.4	– 17.0
DOUGLAS						
Total Labor Force	13,620	13,390	13,260	13,423	– 4.5	+ 3.1
Total Employment	12,920	12,610	12,260	12,597	– 4.5	+ 4.1
Unemployment	700	780	1,000	826	– 5.1	– 9.9
Unemployment Rate	5.1	5.8	7.5	6.2	– 0.6	– 12.6
Quarterly Taxable Sales ($000's)	–	–	–	52,835	– 22.6	+ 4.1
Quarterly Gaming Revenues ($000's)	–	–	–	61,683	– 31.4	+ 14.7
ELKO						
Total Labor Force	13,070	12,900	12,750	12,907	– 4.3	+ 1.3
Total Employment	12,450	12,210	12,040	12,233	– 5.1	+ 4.0
Unemployment	620	690	710	674	+ 11.7	– 30.8
Unemployment Rate	4.7	5.3	5.6	5.2	+ 16.8	– 31.7
Construction Activity						
Elko City						
Residential ($000's)	344	199	212	755	– 18.1	+ 12.0
Nonresidential ($000's)	651	208	4	863	– 78.4	+ 754.5
Total Value ($000's)	995	407	216	1,618	– 67.1	+ 108.8
# of New Dwelling Units	4	2	2	8	– 33.3	+ 14.3
Quarterly Taxable Sales ($000's)	–	–	–	54,694	– 1.8	+ 6.4
Quarterly Gaming Revenues ($000's)	–	–	–	17,726	– 22.7	– 37.3
ESMERALDA						
Total Labor Force	780	780	760	773	– 3.7	+ 5.0
Total Employment	740	730	720	730	– 5.2	+ 5.8
Unemployment	40	50	40	43	+ 30.0	– 7.1
Unemployment Rate	5.1	6.4	5.3	5.6	+ 35.0	– 11.5
Quarterly Taxable Sales ($000's)	–	–	–	1,699	– 34.4	– 5.5
EUREKA						
Total Labor Force	1,240	1,210	1,180	1,210	– 6.4	+ 14.5
Total Employment	1,190	1,160	1,140	1,163	– 6.9	+ 17.9
Unemployment	50	50	40	47	+ 7.7	– 33.3
Unemployment Rate	4.0	4.1	3.4	3.9	+ 15.1	– 41.8
Quarterly Taxable Sales	–	–	–	5,251	– 8.8	– 59.8
HUMBOLDT						
Total Labor Force	5,340	5,220	5,140	5,233	– 8.0	– 1.1
Total Employment	5,040	4,860	4,750	4,883	– 9.5	+ 2.3
Unemployment	300	360	390	350	+ 19.3	– 32.3
Unemployment Rate	5.6	6.9	7.6	6.7	+ 29.7	– 31.5
Quarterly Taxable Sales ($000's)	–	–	–	28,576	+ 0.7	– 15.9
Quarterly Gaming Revenues ($000's)	–	–	–	1,967	– 25.2	+ 14.4

Nevada Statistical Data by County (Continued)

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986	PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986
LANDER						
Total Labor Force	2,180	2,150	2,120	2,150	– 4.6	– 1.1
Total Employment	2,040	2,000	1,980	2,007	– 4.9	+ 1.2
Unemployment	140	150	140	143	– 0.0	– 24.6
Unemployment Rate	6.4	7.0	6.6	6.7	+ 4.8	– 23.7
Quarterly Taxable Sales ($000's)	–	–	–	9,284	+ 1.5	+ 5.0
LINCOLN						
Total Labor Force	2,190	2,210	2,230	2,210	– 0.5	+ 1.5
Total Employment	2,100	2,080	2,090	2,090	– 0.9	+ 3.3
Unemployment	90	130	140	120	+ 9.1	– 21.7
Unemployment Rate	4.1	5.9	6.3	5.4	+ 9.6	– 22.9
Quarterly Taxable Sales ($000's)	–	–	–	1,907	– 10.3	+ 8.6
LYON						
Total Labor Force	10,360	10,180	9,990	10,177	– 5.7	+ 7.7
Total Employment	9,810	9,590	9,380	9,593	– 6.3	+ 11.2
Unemployment	550	590	610	584	+ 5.5	– 28.8
Unemployment Rate	5.3	5.8	6.1	5.7	+ 11.9	– 33.9
Quarterly Taxable Sales ($000's)	–	–	–	15,361	– 9.2	+ 8.8
MINERAL						
Total Labor Force	3,380	3,370	3,320	3,357	+ 2.8	+ 9.0
Total Employment	3,160	3,160	3,120	3,147	+ 2.3	+ 12.4
Unemployment	220	210	200	210	+ 10.5	– 25.0
Unemployment Rate	6.5	6.2	6.0	6.3	+ 7.6	– 31.2
Quarterly Taxable Sales ($000's)	–	–	–	7,159	– 4.7	+ 9.5
NYE						
Total Labor Force	7,170	7,150	7,080	7,133	– 1.1	+ 3.4
Total Employment	6,800	6,790	6,740	6,777	– 0.4	+ 6.2
Unemployment	370	360	340	356	– 13.2	– 31.5
Unemployment Rate	5.2	5.0	4.8	5.0	– 12.2	– 33.8
Quarterly Taxable Sales ($000's)	–	–	–	19,915	+ 3.3	– 12.9
Quarterly Gaming Revenues ($000's)	–	–	–	1,775	+ 13.5	+ 16.0
PERSHING						
Total Labor Force	2,120	2,050	2,030	2,067	– 7.5	+ 20.9
Total Employment	2,040	1,970	1,940	1,983	– 8.6	+ 24.2
Unemployment	80	80	90	84	+ 32.6	– 25.9
Unemployment Rate	3.8	3.9	4.4	4.1	+ 43.3	– 38.7
Quarterly Taxable Sales ($000's)	–	–	–	10,405	+ 16.8	+ 193.6
STOREY						
Total Labor Force	890	870	850	870	– 6.5	– 10.6
Total Employment	830	800	780	803	– 9.1	– 10.7
Unemployment	60	70	70	67	+ 42.9	– 9.1
Unemployment Rate	6.7	8.0	8.2	7.7	+ 52.7	+ 1.7
Quarterly Taxable Sales ($000's)	–	–	–	2,961	– 37.0	– 8.8
Quarterly Gaming Revenues ($000's)	–	–	–	506	– 45.9	+ 31.1
WHITE PINE						
Total Labor Force	4,190	4,160	4,150	4,167	– 2.7	+ 1.5
Total Employment	3,880	3,830	3,790	3,833	– 3.6	+ 4.1
Unemployment	310	330	360	334	+ 8.9	– 21.1
Unemployment Rate	7.4	7.9	8.7	8.0	+ 12.0	– 22.2
Quarterly Taxable Sales ($000's)	–	–	–	10,923	– 16.4	– 10.7
Quarterly Gaming Revenues ($000's)	–	–	–	506	+ 12.9	+ 2.4

Selected U.S. Economic Indicators

Consumer Price Index & Indexes of Selected Categories
All Urban Consumers
(1967 = 100%)

	October 1986	November 1986	December 1986	4th Quarter 1986	PERCENT CHANGE 3rd Quarter-1986 4th Quarter-1986		PERCENT CHANGE 4th Quarter-1985 4th Quarter-1986	
All Items	330.5	330.8	331.1	330.8	+	0.6	+	1.3
Food	323.7	324.6	325.2	324.5	+	0.8	+	4.2
Housing	363.0	361.7	362.1	362.3	–	0.1	+	2.0
Apparel and Upkeep	213.2	213.1	210.9	212.4	+	2.4	+	0.9
Transportation	302.6	304.3	304.8	303.9	+	0.4	–	5.8
Medical Care	442.3	444.6	446.8	444.6	+	1.7	+	7.7

Producer Price Indexes for Selected Commodity Groupings
(1967 = 100%)

All Commodities	298.3	298.7	298.1	298.4	+	0.3	–	3.5
Fuel and Power	440.1	438.2	435.9	438.1	–	2.1	–	30.9
Machinery and Equipment	304.4	304.9	305.0	304.8	+	0.3	+	1.5
Metals and Metal Products	312.1	312.2	311.8	312.0	+	0.3	–	0.5
Nonmetallic Mineral Products	351.2	350.9	349.8	350.6	–	0.3	+	0.0
Textile Products & Apparel	210.9	211.3	211.0	211.1	+	0.0	+	0.3

U.S. Labor Force

Civilian Labor Force (000's)	118,699	118,623	118,049	118,457	–	0.7	+	2.1
Total Employment (000's)	110,857	110,751	110,588	110,732	+	0.6	+	2.3
Unemployment (000's)	7,842	7,872	7,461	7,725	–	4.4	–	1.2
Unemployment Rate	6.6	6.6	6.3	6.5	–	4.9	–	3.5
Unemployment Rate (Seasonally Adjusted)	6.9	6.9	6.7	6.8	–	1.0	–	2.8

DATA SOURCES

Information for statistical tables were developed in cooperation with the following sources:
Airport Authority of Washoe County; Carson City Department of Public Works; Churchill County; City of Elko; City of Las Vegas, Nevada Building and Safety; City of North Las Vegas; City of Reno, Building and Safety Department; City of Sparks; Clark County Department of Aviation; Las Vegas Convention/Visitors Authority; Nevada Power Co.; Reno-Sparks Convention/Visitors Authority; State of Nevada Department of Taxation; State of Nevada Department of Transportation; State of Nevada Employment Security Department; State of Nevada State Gaming Control Board; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; Washoe County Building and Safety Division; White Pine County Regional Planning Commission.

Nevada Review of
BUSINESS & ECONOMICS

Bureau of Business and Economic Research
College of Business Administration
University of Nevada-Reno
Reno, Nevada 89557-0016

CONGRESS INFO SERV
SRI
4520 EAST WEST HWY
BETHESDA MD 20814